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*Annual Report of the Light-House
Board of the United States to the ...*

United States Light-House Board

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ANNUAL REPORT

KF463

OF THE

LIGHT-HOUSE BOARD

FOR THE

FISCAL YEAR ENDED JUNE 30, 1901.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1901.

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ANNUAL REPORT

OF THE

LIGHT-HOUSE BOARD

FOR THE

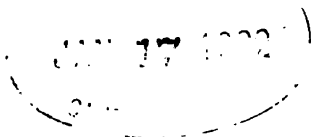
FISCAL YEAR ENDED JUNE 30, 1901.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1901.

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TREASURY DEPARTMENT,
Document No. 2228,
Office of Light-House Board.

ILLUSTRATIONS.

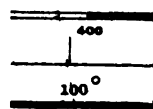
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3-



LIGHT-HOUSE BOARD OF THE UNITED STATES.

Organized in conformity to the act of Congress approved August 31, 1852.

LIST OF MEMBERS ON JUNE 30, 1901.

Hon. LYMAN J. GAGE, Secretary of the Treasury, ex officio President.
Rear-Admiral NORMAN H. FARQUHAR, United States Navy, Chairman.
Col. WALTER S. FRANKLIN.
Col. ALEXANDER MACKENZIE, Corps of Engineers, United States Army.
Brig. Gen. GEORGE L. GILLESPIE, Chief of Engineers, United States Army.
Dr. HENRY S. PRITCHETT, Institute of Technology.
Capt. BENJAMIN P. LAMBERTON, United States Navy.
Capt. WASHBURN MAYNARD, United States Navy, Naval Secretary.
Maj. DANIEL W. LOCKWOOD, Corps of Engineers, United States Army, Engineer Secretary.

EXECUTIVE MEMBERS OF THE BOARD.

Rear-Admiral NORMAN H. FARQUHAR, United States Navy.
Capt. WASHBURN MAYNARD, United States Navy.
Maj. DANIEL W. LOCKWOOD, United States Army.

OFFICERS IN CHARGE OF LIGHT-HOUSE DISTRICTS ON JUNE 30, 1901.

FIRST DISTRICT.

Inspector.—Commander ARTHUR P. NAZRO, United States Navy, Portland, Me.
Engineer.—Lieut. Col. WILLIAM S. STANTON, Corps of Engineers, United States Army, Boston, Mass.

SECOND DISTRICT.

Inspector.—Commander ARTHUR P. NAZRO, United States Navy, Boston, Mass.
Engineer.—Lieut. Col. WILLIAM S. STANTON, Corps of Engineers, United States Army, Boston, Mass.

THIRD DISTRICT.

Inspector.—Capt. WILLIAM M. FOLGER, United States Navy, Tompkinsville, N. Y.
Engineer.—Lieut. Col. D. P. HEAP, Corps of Engineers, United States Army, Tompkinsville, N. Y.

FOURTH DISTRICT.

Inspector.—Commander JOHN HUBBARD, United States Navy, Philadelphia, Pa.
Engineer.—Lieut. Col. WILLIAM A. JONES, Corps of Engineers, United States Army, Philadelphia, Pa.

FIFTH DISTRICT.

Inspector.—Commander ALBERT ROSS, United States Navy, Baltimore, Md.
Engineer.—Lieut. Col. WILLIAM A. JONES, Corps of Engineers, United States Army, Baltimore, Md.

SIXTH DISTRICT.

Inspector.—Commander JOHN A. RODGERS, United States Navy, Charleston, S. C.
Engineer.—Capt. J. C. SANFORD, Corps of Engineers, United States Army, Charleston, S. C.

SEVENTH DISTRICT.

Inspector.—Commander FREDERIC SINGER, United States Navy, Key West, Fla.
Engineer.—Lieut. Col. A. N. DAMRELL, Corps of Engineers, United States Army, Mobile, Ala.

EIGHTH DISTRICT.

Inspector.—Commander KOSSUTH NILES, United States Navy, New Orleans, La.
Engineer.—Lieut. Col. A. N. DAMRELL, Corps of Engineers, United States Army, Mobile, Ala.

NINTH DISTRICT.

Inspector.—Commander F. M. SYMONDS, United States Navy, Chicago, Ill.
Engineer.—Maj. JAMES G. WARREN, Corps of Engineers, United States Army, Milwaukee, Wis.

TENTH DISTRICT.

Inspector.—Commander A. DUNLAP, United States Navy, Buffalo, N. Y.
Engineer.—Maj. T. W. SYMONS, Corps of Engineers, United States Army, Buffalo, N. Y.

ELEVENTH DISTRICT.

Inspector.—Commander J. C. WILSON, United States Navy, Detroit, Mich.
Engineer.—Lieut. Col. THOMAS H. HANDBURY, Corps of Engineers, United States Army, Detroit, Mich.

TWELFTH DISTRICT.

Inspector.—Commander URIEL SEBREE, United States Navy, San Francisco, Cal.
Engineer.—Lieut. Col. CHARLES E. L. B. DAVIS, Corps of Engineers, United States Army, San Francisco, Cal.

THIRTEENTH DISTRICT.

Inspector.—Commander WILLIAM P. DAY, United States Navy, Portland, Oreg.
Engineer.—Capt. WILLIAM C. LANGFITT, Corps of Engineers, United States Army, Portland, Oreg.

FOURTEENTH DISTRICT.

Inspector.—Commander WILLIAM H. TURNER, United States Navy, Cincinnati, Ohio.
Engineer.—Maj. WILLIAM H. BIXBY, Corps of Engineers, United States Army, Cincinnati, Ohio.

FIFTEENTH DISTRICT.

Inspector.—Commander URIAH R. HARRIS, United States Navy, St. Louis, Mo.
Engineer.—Col. AMOS STICKNEY, Corps of Engineers, United States Army, St. Louis, Mo.

SIXTEENTH DISTRICT.

Inspector.—Lieut. Commander A. C. DILLINGHAM, United States Navy, Memphis, Tenn.
Engineer.—Capt. C. L. POTTER, Corps of Engineers, United States Army, Memphis, Tenn.

CHANGES IN PERSONNEL.

The following changes have taken place in the personnel of the Light-House Board since the date of the last annual report:

1. On April 30, 1901, Rear-Admiral FRANCIS J. HIGGINSON, United States Navy, was relieved from duty as chairman, and was succeeded on May 2, 1901, by Rear-Admiral NORMAN H. FARQUHAR, United States Navy.

2. On March 9, 1901, Capt. THOS. PERRY, United States Navy, was succeeded by Capt. WASHBURN MAYNARD, United States Navy.

3. On June 4, 1901, Maj. RICHARD L. HOXIE, Corps of Engineers, United States Army, was succeeded by Maj. DANIEL W. LOCKWOOD, Corps of Engineers, United States Army.

The following-named changes have taken place in the personnel of the district officers during the fiscal year:

FIRST DISTRICT.

Inspector.—Commander JAMES K. COGSWELL, United States Navy, to March 1, 1901; Commander N. J. K. PATCH, United States Navy, to June 1, 1901; Commander ARTHUR P. NAZRO, United States Navy, from June 1, 1901.

SECOND DISTRICT.

Inspector.—Capt. WASHBURN MAYNARD, United States Navy, to October 1, 1900; Commander ARTHUR P. NAZRO, United States Navy, from October 1, 1900.

THIRD DISTRICT.

Inspector.—Capt. (now Rear-Admiral) E. M. SHEPARD, United States Navy, to May 15, 1901; Capt. WILLIAM M. FOLGER, United States Navy, from May 15, 1901.

FOURTH DISTRICT.

Inspector.—Commander ADOLPH MARIX, United States Navy, to March 1, 1901; Lieut. Commander (now Commander) JOHN HUBBARD, United States Navy, from March 1, 1901.

EIGHTH DISTRICT.

Inspector.—Commander J. R. SELFRIDGE, United States Navy, to March 1, 1901; Lieut. Commander A. C. DILLINGHAM, United States Navy, to April 17, 1901; Commander KOSSUTH NILES, United States Navy, from April 17, 1901.

TENTH DISTRICT.

Inspector.—Commander FRANKLIN HANFORD, United States Navy, to October 22, 1900; Commander A. DUNLAP, United States Navy, from October 22, 1900.

FOURTEENTH DISTRICT.

Inspector.—Commander C. T. FORSE, United States Navy, to July 2, 1900; Commander W. H. TURNER, United States Navy, from July 2, 1900.

SIXTEENTH DISTRICT.

Inspector.—Lieut. Commander JAMES M. HELM, United States Navy, to September 30, 1900; Lieut. Commander A. C. DILLINGHAM, United States Navy, from September 30, 1900.

REPORT

OF

THE UNITED STATES LIGHT-HOUSE BOARD.

TREASURY DEPARTMENT,
OFFICE OF THE LIGHT-HOUSE BOARD,
Washington, D. C., September 6, 1901.

SIR: The Light-House Board has the honor to submit the following report for the fiscal year which ended on June 30, 1901:

At the close of the year there were under the control of the Light House Establishment the following-named aids to navigation:

Light-houses and beacon lights.....	1, 306
Light-vessels in position	45
Light-vessels for relief	8
Electric-lighted buoys in position	11
Gas-lighted buoys in position	91
Fog signals operated by steam, caloric, or oil engines	179
Fog signals operated by clockwork	222
Post lights	1, 827
Day or unlighted beacons.....	752
Whistling buoys in position.....	77
Bell buoys in position	122
Other buoys in position, including pile buoys and stakes in Fifth district and buoys in Alaskan waters.....	4, 780

In the construction, care, and maintenance of these aids to navigation there were employed—

Steam tenders.....	34
Steam launches	11
Sailing tenders	2
Light-keepers	1, 420
Other employees, including crews of light-ships and tenders	1, 428
Laborers in charge of post lights	1, 574

NEW LIGHTS.

The following-named lights were established during the fiscal year:
Trinity River beacon light, Galveston Bay, Texas.—A post-lantern light July 1, 1900.
Allouez Bay post light, No. 1, Allouez Bay Channel, Wisconsin.—A post-lantern light July 16, 1900.
Superior Harbor Basin post light, No. 2, Superior Bay, Wisconsin.—A post-lantern light July 16, 1900.
Superior Front Channel post light, No. 4, Superior Bay, Wisconsin.—A post-lantern light July 16, 1900.

- Superior Front Channel post light, No. 6, Superior Bay, Wisconsin.*—A post-lantern light July 16, 1900.
- Superior Front Channel post light, No. 1, Superior Bay, Wisconsin.*—A post-lantern light July 16, 1900.
- Rice Point Channel post light, No. 3, Superior Bay, Minnesota.*—A post-lantern light July 16, 1900.
- Rice Point Channel Range Front post light, No. 5, Superior Bay, Minnesota.*—A post-lantern light July 16, 1900.
- Rice Point Channel Range Rear post light, Superior Bay, Minnesota.*—A post-lantern light July 16, 1900.
- East Gate Basin post light, No. 7, Superior Bay, Minnesota.*—A post-lantern light July 16, 1900.
- Brant Point beacon light, Nantucket Harbor, Massachusetts.*—A lens-lantern light July 23, 1900.
- Long Point beacon light, Lake Borgne, Louisiana.*—A lens-lantern light August 10, 1900.
- Bayou Bonfuca beacon light, Lake Pontchartrain, Louisiana.*—A lens-lantern light August 10, 1900.
- Bayou Lacombe beacon light, Lake Pontchartrain, Louisiana.*—A lens-lantern light August 10, 1900.
- Nonamesset Point Shoal gas buoy, Vineyard Sound, Massachusetts.*—A lens-lantern light August 15, 1900.
- Salem Creek light-station, Delaware River, New Jersey.*—A post-lantern light August 15, 1900.
- Brush Point beacon light, St. Marys River, Michigan.*—A post-lantern light August 20, 1900.
- Portage River Pierhead light-station, Keweenaw Bay, Michigan.*—A lens-lantern light August 30, 1900.
- Portage Range front light, Portage River, Michigan.*—A fifth-order light August 30, 1900.
- Cole Creek beacon light, Portage River, Michigan.*—A lens-lantern light August 30, 1900.
- Harrington Island beacon light, Portage River, Michigan.*—A lens-lantern light August 30, 1900.
- High Point beacon light, Portage River, Michigan.*—A lens-lantern light August 30, 1900.
- Mulietoa Shoal gas buoy, Lake Michigan, Michigan.*—A lens-lantern light September 4, 1900.
- Bull Bay light-station, seacoast of South Carolina.*—A fourth-order light September 8, 1900.
- Mare Island Strait Shoal beacon light, San Pablo Bay, California.*—A post-lantern light September 22, 1900.
- Bayou Teche beacon light, Atchafalaya River, Louisiana.*—A post-lantern light October 3, 1900.
- Racine Breakwater beacon light, Lake Michigan, Wisconsin.*—A post-lantern light October 13, 1900.
- Tail of the Horseshoe light-vessel, Chesapeake Bay, Virginia.*—Two lens-lantern lights October 15, 1900.
- Sheboygan Breakwater beacon light, Lake Michigan, Wisconsin.*—A lens-lantern light October 24, 1900.
- Kenosha Breakwater beacon light, Lake Michigan, Wisconsin.*—A lens-lantern light October 26, 1900.
- Jekyl Island Jetty beacon light, Brunswick River, Georgia.*—A post-lantern light November 5, 1900.

- Point Montara light-station, seacoast of California.*—A lens-lantern light November 26, 1900.
- Lime Point light-station, San Francisco Bay, California.*—A lens-lantern light November 26, 1900.
- Angel Island light-station, San Francisco Bay, California.*—A lens-lantern light November 26, 1900.
- Piney Point post light, No. 36, St. Johns River, Florida.*—A post-lantern light December 1, 1900.
- Mandarin Point post light, No. 29, St. Johns River, Florida.*—A post-lantern light December 1, 1900.
- Shark Shoal beacon light, Beaufort Harbor, North Carolina.*—A post-lantern light December 15, 1900.
- Reids Creek beacon light, Beaufort Harbor, North Carolina.*—A post-lantern light December 15, 1900.
- Lewis Thorofare beacon light, Beaufort Harbor, North Carolina.*—A post-lantern light December 15, 1900.
- East Marsh Island beacon light, No. 2, Ashley River, South Carolina.*—A post-lantern light December 21, 1900.
- Sisters Rocks beacon light, No. 6, Ashley River, South Carolina.*—A post-lantern light December 21, 1900.
- West Marsh Island beacon light, No. 6, Ashley River, South Carolina.*—A post-lantern light December 21, 1900.
- Bull beacon light, No. 1, Ashley River, South Carolina.*—A post-lantern light December 21, 1900.
- Cowhead Shoal range beacon lights, Ashley River, South Carolina.*—Two post-lantern lights December 21, 1900.
- Caucus Cut range beacon lights, Pensacola Bay, Florida.*—Two lens-lantern lights December 22, 1900.
- Mile Point Cut range post lights, St. Johns River, Florida.*—Two post-lantern lights January 1, 1901.
- Patchogue Breakwater beacon light, Great South Bay, New York.*—A post-lantern light January 10, 1901.
- Santa Rosa Sound range beacon lights, Choctawhatchee Bay, Florida.*—Two lens-lantern lights January 10, 1901.
- Deer Point beacon light, Santa Rosa Sound, Florida.*—A lens-lantern light January 15, 1901.
- Middle beacon light, Pensacola East Bay, Florida.*—A lens-lantern light January 15, 1901.
- Biloxi Harbor beacons A, B, C, and D, Mississippi.*—Four post-lantern lights January 26, 1901.
- West Bank light-station, New York Lower Bay, New York.*—A fourth-order light January 31, 1901.
- Cedar Creek Cut post light, No. 2 1-2, St. Johns River, Florida.*—A post-lantern light February 5, 1901.
- Dancey Point range front post light, No. 47 1-2, St. Johns River, Florida.*—A post-lantern light February 5, 1901.
- St. Andrews Bay range beacon lights, Florida.*—Two lens-lantern lights February 8, 1901.
- St. Andrews Bar range beacon lights, Florida.*—Two lens-lantern lights February 8, 1901.
- Northwest Bar beacon light, entrance to Key West Harbor, Florida.*—A lens-lantern light February 15, 1901.
- Point Arguello light-station, seacoast of California.*—A fourth-order light February 22, 1901.

- Point Pinelos beacon light, Tampa Bay, Florida.*—A lens-lantern light February 25, 1901.
- Point Edith beacon light, Suisun Bay, California.*—A lens-lantern light March 4, 1901.
- Middle Point beacon light, Suisun Bay, California.*—A lens-lantern light March 4, 1901.
- Stake Point beacon light, Suisun Bay, California.*—A lens-lantern light March 4, 1901.
- Terraceia Point beacon light, No. 1, Tampa Bay, Florida.*—A lens-lantern light March 4, 1901.
- Mosquito Bank beacon light, Hawk Channel, Florida.*—A lens-lantern light March 5, 1901.
- Bonobles Bank beacon light, Hawk Channel, Florida.*—A lens-lantern light March 6, 1901.
- Cape Florida Shoal beacon light, Hawk Channel, Florida.*—A lens-lantern light March 7, 1901.
- Stave Mill lower range rear light, Coos Bay, Oregon.*—A post-lantern light March 27, 1901.
- Stave Mill upper range rear light, Coos Bay, Oregon.*—A post-lantern light March 27, 1901.
- Marshfield range lights, Coos Bay, Oregon.*—Two post-lantern lights March 27, 1901.
- Seventeen-Foot Knoll gas buoy, Delaware River, New Jersey.*—A lens-lantern light April 1, 1901.
- Deadmans Island Breakwater beacon light, entrance to San Pedro Harbor, California.*—A lens-lantern light April 11, 1901.
- San Pedro Harbor beacon light, No. 4, California.*—A post-lantern light April 11, 1901.
- Nantucket Breakwater lights, Nantucket Sound, Massachusetts.*—Two lens-lantern lights April 20, 1901.
- Rains Dock gas buoy No. 18, St. Marys River, Michigan.*—A lens-lantern light April 26, 1901.
- Middle Shoal gas buoy, Lake Michigan, Michigan.*—A lens-lantern light April 26, 1901.
- Graveyard Reach post light, James River, Virginia.*—A post-lantern light May 1, 1901.
- Kingsland Creek post light, James River, Virginia.*—A post-lantern light May 1, 1901.
- Toledo Harbor light-station, Lake Erie, Ohio.*—Temporary post-lantern light May 4, 1901.
- Moultrieville beacon light, Charleston Harbor, South Carolina.*—A post-lantern light May 6, 1901.
- East Gate Basin post light, No. 2, Superior Bay, Minnesota.*—A post-lantern light May 8, 1901.
- Duluth Harbor Basin post light, No. 1, Lake Superior, Minnesota.*—A post-lantern light May 17, 1901.
- Mackinac Spit gas buoy No. 22, Straits of Mackinac, Michigan.*—A lens-lantern light May 19, 1901.
- Martin Reef gas buoy, No. 9, northerly end of Lake Huron, Michigan.*—A lens-lantern light May 20, 1901.
- Stribling Point gas buoy, No. 35, St. Marys River, Michigan.*—A lens-lantern light May 20, 1901.
- Tawas Point gas buoy, No. 6, entrance to Saginaw Bay, Lake Huron, Michigan.*—A lens-lantern light May 26, 1901.

- North Point gas buoy, No. 10, entrance to Thunder Bay, Lake Huron, Michigan.*—A lens-lantern light May 26, 1901.
- Gravelly Point Shoal gas buoy, No. 4, Saginaw Bay, Michigan.*—A lens-lantern light May 27, 1901.
- Pointe aux Frenes gas buoy, No. 11, St. Marys River, Michigan.*—A lens-lantern light June 9, 1901.
- Bird Key beacon light, No. 9, Terraceia Bay, Florida.*—A lens-lantern light June 27, 1901.
- Wreck Point beacon light, seacoast of North Carolina.*—A lens-lantern light June 28, 1901.
- Stonington Outer Breakwater beacon light, Fishers Island Sound, Connecticut.*—A lens-lantern light June 30, 1901.

NEW FOG-SIGNALS.

During the fiscal year the following-named fog-signals were established:

- Tail of the Horseshoe light-vessel, Chesapeake Bay, Virginia.*—A 12-inch steam whistle October 15, 1900.
- Lambert Point fog-signal station, Elizabeth River, Virginia.*—A bell struck by machinery April 1, 1901.
- Alcatraz fog-signal station, San Francisco Bay, California.*—A bell struck by machinery April 5, 1901.

During the fiscal year fog-signals were established at the following-named existing light-stations:

- Blue Hill Bay light-station, Blue Hill Bay, Maine.*—A bell struck by machinery September 15, 1900.
- Governors Island post light-station, New York Harbor, New York.*—A blower siren November 12, 1900.
- Kenosha Pierhead light-station, Lake Michigan, Wisconsin.*—A blower siren April 25, 1901.
- Frankfort Pierhead light-station, Lake Michigan, Michigan.*—A compressed-air siren May 11, 1901.
- West Bank light-station, New York lower bay, New York.*—A compressed-air siren June 1, 1901.
- Point Arguello light-station, seacoast of California.*—A compressed-air siren June 1, 1901.
- Warrick light-station, Narragansett Bay, Rhode Island.*—A blower siren June 15, 1901.
- Pomham Rocks light-station, Providence River, Rhode Island.*—A blower siren June 15, 1901.

LIGHTS DISCONTINUED.

In the course of the fiscal year the following-named lights were discontinued:

- Superior Bay Channel upper post light, Superior Bay Channel, Minnesota.*—A lantern light July 16, 1900.
- Connors Point and Rice Point range post lights, Superior Bay, Minnesota.*—Three lantern lights July 16, 1900.
- Leader wreck lighted buoy, Detroit River, Michigan.*—July 18, 1900.
- Rockhall Creek range rear beacon light, No. 2, Rockhall Creek, Maryland.*—A post-lantern light August 28, 1900.

- Upper Mile Point Cut post light M6, St. Johns River, Florida.*—A post-lantern light September 8, 1900.
- St. Marys Falls Canal (S. pier) light-station, St. Marys River, Michigan.*—A lens-lantern light November 1, 1900.
- Point Pleasant post light, Skagit Bay, Washington.*—A tubular-lantern light November 22, 1900.
- Lower Cedar Creek Cut post light C3, St. Johns River, Florida.*—A post-lantern light December 2, 1900.
- Fort George Creek range rear beacon light, St. Johns River, Florida.*—December 30, 1900.
- Choctawhatchee Bay range beacon lights, Florida.*—Two post-lantern lights January 10, 1901.
- Brant Point beacon light, Nantucket Harbor, Massachusetts.*—A post-lantern light January 31, 1901.
- West Bank light-station, New York lower bay, New York.*—A post-lantern light January 31, 1901.
- Whetstone Point post light, No. 66, St. Johns River, Florida.*—A post-lantern light February 5, 1901.
- North Middle Ground gas buoy, St. Marys River, Michigan.*—A lens-lantern light opening of navigation, 1901.
- Malietoa Shoal gas buoy, Grays Reef Passage, Lake Michigan, Michigan.*—A lens-lantern light April 26, 1901.
- Big Sodus light, Lake Ontario, New York.*—A fourth-order light June 20, 1901.

CHANGES IN LIGHTS.

During the fiscal year the following changes were made in existing lights:

- Simmons Reef gas buoy, Lake Michigan, Michigan.*—Substituted for and moored in about the same position as the former Simmons Reef light-vessel July 10, 1900.
- Lansing Shoal light-vessel, Lake Michigan, Michigan.*—Substituted for and moored in about the same position as the former Lansing Shoal gas buoy July 10, 1900.
- Dark Hole gas buoy, No. 24, St. Marys River, Michigan.*—Color of light changed July 13, 1900.
- Vidal Shoals Channel east end (north side) gas buoy, No. 90, St. Marys River, Michigan.*—Color of light changed July 13, 1900.
- Vidal Shoals Channel west end (north side) gas buoy, No. 92, St. Marys River, Michigan.*—Color of light changed July 13, 1900.
- Middle Ground gas buoy, No. 98, St. Marys River, Michigan.*—Color of light changed July 13, 1900.
- Gros Cap Reef gas buoy, No. 106, St. Marys River, Michigan.*—Color of light changed July 13, 1900.
- Port Pontchartrain light-station, Lake Pontchartrain, Louisiana.*—Characteristic of light changed July 16, 1900.
- Quebec Channel post light, Superior Bay, Wisconsin.*—Color of light changed July 16, 1900.
- Superior Bay Channel lower post light, Superior Bay, Minnesota.*—Color of light and structure changed July 16, 1900.
- Superior Bay Channel upper post light, Superior Bay, Minnesota.*—Color of light and structure changed July 16, 1900.

- St. Louis Bay North Channel east range front post light, St. Louis Bay, Minnesota.*—Color of light and structure changed July 16, 1900.
- St. Louis Bay North Channel west range front post light, St. Louis Bay, Minnesota.*—Color of light and structure changed July 16, 1900.
- St. Louis Bay South Channel west range front post light, St. Louis Bay, Minnesota.*—Color of light and structure changed July 16, 1900.
- New Haven Long Wharf light-station, New Haven Harbor, Connecticut.*—Changed from lens-lantern to reflector light July 24, 1900.
- Port Jefferson west beacon light, Long Island Sound, New York.*—Color of light changed July 25, 1900.
- Port Jefferson east breakwater beacon light, Long Island Sound, New York.*—Color, order, and height of light changed July 25, 1900.
- Sturgeon Bay Canal light-station, Lake Michigan, Wisconsin.*—Color of tower changed August 20, 1900.
- Shovelful Shoal light-vessel, No. 3, Nantucket Sound, Massachusetts.*—Appearance changed in August, 1900.
- Spring Point Ledge light-station, Portland Harbor, Maine.*—Characteristic of light changed September 1, 1900.
- Humboldt Bay Entrance range rear beacon light, seacoast of California.*—Color of light changed September 1, 1900.
- Diamond Shoal light-vessel, off seacoast of North Carolina.*—Light-vessel No. 71 withdrawn and station marked by light-vessel No. 69, September 2, 1900; light-vessel No. 69 withdrawn and light-vessel No. 72 placed on station February 15, 1901.
- Salem Creek light-station, Delaware River, New Jersey.*—Changed from a post to a lens-lantern light September —, 1900.
- Unatilla Reef light-vessel, seacoast of Washington.*—Oil lights substituted for electric lights, height of lights and distance of visibility changed September 6, 1900.
- Six-Foot Spot beacon light, St. George Sound, Florida.*—Changed from a post to a lens-lantern light September 16, 1900.
- Porter Bar beacon light, St. George Sound, Florida.*—Changed from a post to a lens-lantern light September 16, 1900.
- Bulkhead Cut range beacon lights, Apalachicola Bay, Florida.*—Changed from post to lens-lantern lights September 16, 1900.
- Apalachicola Bay range beacon lights, Apalachicola Bay, Florida.*—Changed from post to lens-lantern lights September 17, 1900.
- Muskegon Lake beacon light, Muskegon Lake, Michigan.*—Changed from a post to a lens-lantern light September 18, 1900.
- North Head light-station, seacoast of Washington.*—Color of tower changed September 21, 1900.
- Presqu'île fog-signal station, Lake Erie, Pennsylvania.*—Color of fog-signal house changed September 22, 1900.
- Oswego Breakwater light-station, Lake Ontario, New York.*—Color of tower changed September 30, 1900.
- Port Stevens Wharf post light, Columbia River, Oregon.*—Color of light changed October 1, 1900.
- Conneaut Range rear light-station, Lake Erie, Ohio.*—Color of light changed October 1, 1900.
- Racine Reef beacon light, Lake Michigan, Wisconsin.*—Height increased October 3, 1900.

- Hatteras Inlet light-station, seacoast of North Carolina.*—Characteristic of light changed October 8, 1900.
- Whitefish Point light-station, Lake Superior, Michigan.*—Characteristic of light changed October 12, 1900.
- Huron light-station, Lake Erie, Ohio.*—Appearance of tower changed October 20, 1900.
- Key West Main Ship Channel range rear light-station, Florida.*—Color of structure changed October 25; height of light increased December 7, 1900.
- South Cut lower light, Tampa Bay, Florida.*—Numbered November 2, 1900.
- South Cut upper light, Tampa Bay, Florida.*—Numbered November 2, 1900.
- North Cut lower light, Tampa Bay, Florida.*—Numbered November 2, 1900.
- Jekyll Island range beacon lights, Brunswick River, Georgia.*—Color of lights changed November 5, 1900.
- Colonels Island range beacon lights, Turtle River, Georgia.*—Color of lights changed November 5, 1900.
- Ontonagon Pierhead light-station, Lake Superior, Michigan.*—Light changed from temporary post lantern to fourth order November 10, 1900.
- Sassafras Point light-station, Providence River, Rhode Island.*—Color of light changed November 15, 1900.
- Jones Point light-station, Potomac River, Virginia.*—Color of light changed November 20, 1900.
- White Point light, Pensacola East Bay, Florida.*—Changed from post to lens-lantern light November 28, 1900.
- Escribano Point light, Blackwater Bay, Florida.*—Changed from post to lens-lantern light November 28, 1900.
- Devils Point light, Escambia Bay, Florida.*—Changed from post to lens-lantern light November 29, 1900.
- Fort McRee range light-station, Pensacola Bay, Florida.*—Changed from post to lens-lantern lights and colors of lights changed December 1, 1900.
- Fort Barrancas range light-station, Pensacola Bay, Florida.*—Changed from post to lens-lantern lights and colors of lights changed December 1, 1900.
- Choctaw Pass Channel range rear beacon light, No. 3, Mobile Bay, Alabama.*—Changed from a post to a lens-lantern light December 1, 1900; structure rebuilt and height of light increased February 19, 1901.
- Sandusky Bay inner range light-station, Lake Erie, Ohio.*—Colors of lights changed and arcs of illumination reduced December 1, 1900.
- Chicago Outer Breakwater (N.W. end) light-station, Lake Michigan, Illinois.*—Color of light changed December 8, 1900.
- Cheboygan River range rear light-station, Straits of Mackinac, Michigan.*—Moved to new structure and height of light increased December 10, 1900.
- Borden Flats light-station, Mount Hope Bay, Massachusetts.*—Characteristic of light changed December 31, 1900.
- Cherry Island range front light-station, Delaware River, Delaware.*—Characteristic of light in red sector changed December, 1900.
- Oak Bluff post light, East River, New York.*—Height of light decreased January 9, 1901.

- Fishing Point beacon light, seacoast of Virginia.*—Placed on new structure and height increased January 10, 1901.
- Kenosha (Southport) light-station, Lake Michigan, Wisconsin.*—Characteristic of light changed January 25, 1901.
- Brant Point light-station, Nantucket Harbor, Massachusetts.*—Height of light and range of visibility reduced January 31, 1901.
- Bloody Point rangerear light-station, entrance to Savannah River, South Carolina.*—Color of structure changed February 14, 1901.
- White Point light, Pensacola East Bay, Florida.*—Characteristic of light changed February 20, 1901.
- Middle beacon light, Pensacola East Bay, Florida.*—Characteristic of light changed February 20, 1901.
- Escribano Point light, Blackwater Bay, Florida.*—Characteristic of light changed February 20, 1901.
- Caucus Cut range front beacon light, Pensacola Bay, Florida.*—Color of structure changed February 25, 1901.
- Overfalls light-vessel, seacoast of New Jersey.*—Light-vessel No. 46 withdrawn and light-vessel No. 69 permanently placed on station; electric substituted for oil lights; height and visibility of lights increased March 1, 1901.
- Biloxi Harbor beacon lights A, B, C, and D, Mississippi.*—Changed from post to lens-lantern lights March 1, 1901.
- San Francisco light-vessel, entrance to San Francisco Harbor, California.*—Lights changed from electric to oil lights of less height and reduced visibility March 4, 1901.
- Four-Foot Shoal beacon light, Hawk Channel, Florida.*—Changed from post to lens-lantern light March 16, 1901.
- East Turtle Shoal beacon light, Hawk Channel, Florida.*—Changed from post to lens-lantern light March 17, 1901.
- East Washervoman Shoal beacon light, Hawk Channel, Florida.*—Changed from post to lens-lantern light March 17, 1901.
- Sandusky Bay outer range light-station, Lake Erie, Ohio.*—Color of structure changed in March, 1901.
- Sandusky Bay inner range light-station, Lake Erie, Ohio.*—Color of structure changed in March.
- Stave Mill light, Coos Bay, Oregon.*—Characteristic changed March 27, 1901.
- Green Island light-station, Lake Erie, Ohio.*—Characteristic of light changed April 1, 1901.
- Overfalls light-vessel No. 69, off seacoast of New Jersey.*—Characteristic of lights changed April 5, 1901.
- Fort Sumter, Main Channel range front, light-station, Charleston Harbor, South Carolina.*—Color of structure changed April 6, 1901.
- Dunkirk light-station, Lake Ontario, New York.*—Characteristic of light changed April 19, 1901.
- Newcastle range front light-station, Delaware River, Delaware.*—Color of structure changed April 26, 1901.
- Newcastle range rear light-station, Delaware River, Delaware.*—Color of structure changed May 2, 1901.
- Mount Pleasant range lights, Charleston Harbor, South Carolina.*—Order of front light and characteristic of rear light changed May 6, 1901.

- Green Island light-station, Lake Erie, Ohio.*—Characteristic of light changed May 9, 1901.
- Mare Island Strait Shoal beacon light, San Pablo Bay, California.*—Changed from post to lens-lantern light May 15, 1901.
- Fort Mifflin Bar range front (Billingsport) light-station, Delaware River, New Jersey.*—Appearance of station changed May 27, 1901.
- Tinicum Island range rear light-station, Delaware River, New Jersey.*—Appearance of tower changed May 27, 1901.
- Newburyport Upper Harbor range (outer beacon) light, Massachusetts.*—Height increased May 28, 1901.
- Snead Point Shoal beacon light, Manatee River, Tampa Bay, Florida.*—Height increased June 4, 1901.
- Manatee River Cut beacon light, Tampa Bay, Florida.*—Height increased June 4, 1901.
- Big Sodus outer light, Lake Ontario, New York.*—Changed from sixth to fourth order light and characteristic changed June 10, 1901.
- Deep Water Point range light-station, Delaware River, New Jersey.*—Coloring of structures and appearance of rear tower changed June 17, 1901.
- Schooner Ledge range light-station, Delaware River, Pennsylvania.*—Coloring of structures and appearance of rear tower changed June 17, 1901.
- North Head light-station, seacoast of Washington.*—Coloring of dwelling changed June 18, 1901.
- Tail of the Horseshoe light-vessel, Chesapeake Bay, Virginia.*—Light-vessel No. 46 permanently substituted for light-vessel No. 71; lights changed from lens-lantern to reflector lights of less height and reduced visibility; color of hull changed June 23, 1901.
- Elizabeth River entrance gas buoy, Hampton Roads, Virginia.*—Characteristic of light changed June 28, 1901.
- Falkner Island light-station, Long Island Sound, Connecticut.*—Characteristic of light changed June 30, 1901.
- Conover beacon (Conover and Chapel Hill range front) light-station, New York Lower Bay, New Jersey.*—Coloring of daymarks changed June 30, 1901.
- Brush Point beacon light, St. Marys River, Michigan.*—Characteristic changed June 30, 1901.

FOG-SIGNALS DISCONTINUED.

In the course of the fiscal year the following-named fog-signal was discontinued:

- Stratford Shoal (Middle Ground) light-station, Long Island Sound, New York.*—A bell struck by machinery November 24, 1900.

CHANGES IN FOG-SIGNALS.

During the fiscal year the following-named changes were made in fog-signals:

- Genesee Range front light-station, Lake Ontario, New York.*—Size of fog whistle increased November 22, 1900.
- Wind Point (Racine Point) light-station, Lake Michigan, Wisconsin.*—Fog-signal changed from whistle to compressed-air siren and characteristic of fog-signal changed December 8, 1900.

- Little Gull Island light-station, Long Island Sound, New York.*—Characteristic of fog-signal changed December 25, 1900.
- Detour light-station and mouth of St. Marys River, Lake Huron, Michigan.*—Additional characteristic added to fog-signal June 10, 1901.
- Tail of the Horseshoe light-vessel, Chesapeake Bay, Virginia.*—Characteristic of fog-signal changed June 23, 1901.
- Presqu'île Pierhead light-station, Erie Harbor, Pennsylvania.*—Characteristic of fog bell changed June 30, 1901.

CHANGES IN LOCATION.

During the fiscal year the following-described changes in location were made:

- South Haven Pierhead light-station, Lake Michigan, Michigan.*—Moved 250 feet to outer end of extension of south pier July 4, 1900.
- Junction post light, Superior Bay and Superior Front channels, Minnesota.*—Structure moved and light reestablished 1,000 feet southward July 16, 1900.
- Kenosha Pierhead range rear light, Lake Michigan, Wisconsin.*—Moved 380 feet to eastward August 13, 1900.
- Rockland Breakwater light-station, entrance to Rockland Harbor, Maine.*—Moved 25 feet northerly August 25, 1900.
- Horn Island light-station, Horn Island Pass, Mississippi.*—Light and structure moved 253 feet N. $\frac{1}{4}$ W. August 31, 1900.
- Fort McRee range front light, Pensacola Bay, Florida.*—Moved 9 feet west in September, 1900.
- Fort Barrancas range front light, Pensacola Bay, Florida.*—Moved 9 feet west in September, 1900.
- Coan River gas buoy, Potomac River, Maryland.*—Moved about one-fifth mile S. by W. October 16, 1900.
- Galveston Bar whistling buoy, entrance to Galveston Bay, Texas.*—Moved five-eighths mile southeasterly October 28, 1900.
- Long Island Head light-station, Boston Harbor, Massachusetts.*—Moved 400 feet NW. by W. $\frac{3}{4}$ W. October 30, 1900.
- Currituck Sound beacon light No. 8 (Long Point), North Carolina.*—Moved 80 feet to northward November 1, 1900.
- Ontonagon Pierhead light-station, Lake Superior, Michigan.*—Moved to new west pier November 10, 1900.
- Cleveland West Pier light-station, Lake Erie, Ohio.*—Moved to outer end of new west pier November 29, 1900.
- Christiana beacon light, Delaware River, Delaware.*—Moved 300 feet S. $\frac{1}{4}$ E. December 28, 1900.
- Fort George Creek range front beacon light, St. Johns River, Florida.*—Moved one-eighth mile SE. by E. $\frac{3}{4}$ E. from Pilot Town range rear beacon light December 30, 1900.
- Fishing Point beacon light, seacoast of Virginia.*—Moved 230 feet northeasterly January 10, 1901.
- Brant Point light-station, Nantucket Harbor, Massachusetts.*—Moved 596 feet E. $\frac{1}{4}$ S. January 31, 1901.
- Nine-Mile Flat post light, St. Johns River, Florida.*—Moved one-fifth mile NNW. February 5, 1901.

- Dancey Point post light, No. 49, St. Johns River, Florida.*—Moved 300 feet northwesterly February 5, 1901.
- Purtan Bay post light, No. 1, York River, Virginia.*—Moved about one-half mile SE. $\frac{1}{4}$ E. February 18, 1901.
- Mare Island Strait Shoal beacon light, San Pablo Bay, California.*—Moved 260 feet NE. $\frac{1}{2}$ E. March 23, 1901.
- Grays Reef light-vessel, Lake Michigan, Michigan.*—Moved three-fifths mile SE. by E. April 20, 1901.
- Charity Shoal gas buoy, Lake Ontario, New York.*—Moved seven-eighths mile SE. $\frac{1}{4}$ E. April 24, 1901.
- Middle Ground gas buoy, St. Marys River, Michigan.*—Moved to the southward and eastward April 29, 1901.
- Mount Pleasant range lights, Charleston Harbor, South Carolina.*—Moved to northward and westward May 6, 1901.

NEW BUOYS.

During the fiscal year the following-named special buoys were established:

- Sherman Rock bell buoy, Lynn Canal, southeastern Alaska.*—July 30, 1900.
- Egg Rock whistling buoy, Frenchman Bay, Maine.*—July 31, 1900.
- Nonamesset Point Shoal gas buoy, Vineyard Sound, Massachusetts.*—August 15, 1900.
- Malietoa Shoal gas buoy, Lake Michigan, Michigan.*—September 4, 1900.
- Cranberry Point bell buoy, Prospect Harbor, Maine.*—October 22, 1900.
- McCries Shoal whistling buoy, seacoast of New Jersey.*—October 29, 1900.
- May Flint wreck whistling buoy, San Francisco Harbor, California.*—November 17, 1900.
- Craven Shoal bell buoy, New York Lower Bay, New York.*—March 21, 1901.
- Seventeen-Foot Knoll gas buoy, Delaware River, New Jersey.*—April 1, 1901.
- Middle Shoal gas buoy, Lake Michigan, Michigan.*—April 26, 1901.
- Rains Dock gas buoy, No. 18, St. Marys River, Michigan.*—April 26, 1901.
- Mackinac Spit gas buoy, No. 22, Straits of Mackinac, Michigan.*—May 19, 1901.
- Martin Reef gas buoy, No. 9, northerly end of Lake Huron, Michigan.*—May 20, 1901.
- Stribling Point gas buoy, No. 35, St. Marys River, Michigan.*—May 20, 1901.
- Tawas Point gas buoy, No. 6, entrance to Saginaw Bay, Lake Huron, Michigan.*—May 26, 1901.
- North Point gas buoy, No. 10, entrance to Thunder Bay, Lake Huron, Michigan.*—May 26, 1901.
- Gravelly Point Shoal gas buoy, No. 4, Saginaw Bay, Michigan.*—May 27, 1901.
- Pointe aux Frênes gas buoy, No. 11, St. Marys River, Michigan.*—June 9, 1901.

BUOYS DISCONTINUED.

In the course of the fiscal year the following-named special buoys were discontinued:

- Junction bell buoy, Chesapeake Bay, Virginia.*—October 15, 1900.
Ardandhu wreck gas buoy, Vineyard Sound, Massachusetts.—December 19, 1900.
Maliotoa Shoal gas buoy, Grays Reef Passage, Lake Michigan, Michigan.—April 26, 1901.
North Middle Ground gas buoy, St. Marys River, Michigan.—Opening of navigation, 1901.

TEMPORARY CHANGES IN AIDS TO NAVIGATION.

The following temporary changes were made in aids to navigation during the fiscal year:

- Arena Cove bell buoy, Arena Cove, California.*—Adrift July 3; replaced October 17, 1900; not sounding June 17; repaired June 18.
Chapman Shoal gas buoy, No. 12, St. Lawrence River, New York.—Adrift; was replaced on station July 3, 1900.
Off Newburyport Bar whistling buoy, Newburyport Harbor entrance, Massachusetts.—Not sounding; repaired July 6, 1900.
Succonnesset Shoal light-vessel, Nantucket Sound, Massachusetts.—Light-vessel No. 6 replaced on station and relief light-vessel No. 9 withdrawn July 6, 1900; light-vessel No. 6 withdrawn for repairs and station marked by relief light-vessel No. 9, May 31; light-vessel No. 6 replaced on station and relief light-vessel No. 9 withdrawn June 28, 1901.
Pollock Rip light-vessel, entrance to Nantucket Sound, Massachusetts.—Relief light-vessel No. 58 adrift July 7; moored 900 feet to southward of station July 8; replaced on station July 24; light-vessel No. 47 replaced on station and relief light-vessel No. 58 withdrawn July 31, 1900.
Ballard Reef Channel middle gas buoy, Detroit River, Michigan.—Extinguished July 10 and marked by a hand-lantern light; reestablished July 25, 1900.
Pollock Rip Slue gas buoy, entrance to Nantucket Sound, Massachusetts.—Damaged by collision; light extinguished and buoy temporarily marked by lantern light; replaced by another buoy and light reestablished July 11, 1900; extinguished September 23, relighted September 26; extinguished December 26, relighted December 30, 1900; extinguished January 29, relighted January 30; extinguished March 18; replaced by another buoy and relighted March 23; extinguished June 28; relighted.
Mc Williams Point Shoal light, Pamlico River, North Carolina.—Structure carried away and light extinguished July 14; temporarily repaired and relighted August 14, 1900; rebuilt and permanently relighted October 11, 1900.
Horn Island light-station, Horn Island Pass, Mississippi.—Characteristic of light temporarily changed July 15, 1900; restored November 1, 1900.
Mobile Ship Channel light, No. 22, Mobile Bay, Alabama.—Extinguished July 18; relighted July 19, 1900.

Inner gas buoy, Galveston Harbor, Texas.—Extinguished July 20; relighted July 21, 1900.

Buffalo Breakwater (north end) light-station, Lake Erie, New York.—Sounding of steam fog whistle resumed July 20, 1900.

Cat Island light-station, Mississippi Sound, Mississippi.—Characteristic of light temporarily changed July 21, 1900; restored November 21, 1900.

San Francisco light-vessel, No. 70, entrance to San Francisco Harbor, California.—Electric lights extinguished and oil lights shown from July 25 to July 29; steam whistle not sounding from September 30 to October 6; light-vessel withdrawn for repairs and station marked by gas buoy November 5; light-vessel replaced on station and gas buoy withdrawn December 10, 1900. Oil lights substituted for electric lights February 12 to 14; bell sounded instead of steam fog whistle February 16; light-vessel withdrawn for repairs and station marked by gas buoy April 3; light-vessel replaced on station and buoy withdrawn May 2, 1901.

Fire Island light-vessel, off seacoast of New York.—Light-vessel No. 68 withdrawn for repairs and station marked by relief light-vessel No. 11 August 1, 1900; light-vessel No. 68 replaced on station and relief light-vessel No. 11 withdrawn November 21, 1900.

Coan River gas buoy, Potomac River, Virginia.—Extinguished August 4; relighted August 15, 1900.

Hay Lake Channel Entrance gas buoy, No. 35, Little Mud Lake, Michigan.—Dragged from its position August 4; replaced on station August 6, 1900.

Cornfield Point light-vessel, Long Island Sound, Connecticut.—Light-vessel No. 48 replaced on station and relief light-vessel No. 20 withdrawn August 8; adrift November 10; replaced on station November 12, 1900. Light-vessel No. 48 withdrawn for repairs and station marked by relief light-vessel No. 11 June 7; light-vessel No. 48 replaced on station and relief light-vessel No. 11 withdrawn June 28, 1901.

Limekiln Crossing light-vessel (North), No. 65, Detroit River, Michigan.—Temporarily moved 250 feet to the southward August 11, 1900; replaced April 8, 1901.

Gloucester Breakwater gas buoy, entrance to Gloucester Harbor, Massachusetts.—Extinguished; relighted August 21, 1900.

White Island whistling buoy, seacoast of New Hampshire.—Not sounding August 22; replaced by perfect buoy August 24, 1900.

East Bank gas buoy, No. 6, New York Lower Bay, New York.—Damaged by collision and temporarily discontinued August 25, 1900; replaced; damaged by collision and temporarily discontinued January 21, 1901; replaced April 25, 1901.

Rock Island Reef gas buoy, No. 23, St. Lawrence River, New York.—Dragged out of position August 25; replaced August 31, 1900.

Trinidad Head light-station, seacoast of California.—Fog-signal temporarily discontinued for repairs August 26; sounding of signal resumed September 17, 1900.

Great Round Shoal light-vessel, entrance to Nantucket Sound, Massachusetts.—Light-vessel No. 42 withdrawn for repairs and station marked by relief light-vessel No. 58 August 28; light-vessel No. 42 replaced on station and relief light-vessel No. 58 withdrawn October 21, 1900.

- Mount Desert light-station, seacoast of Maine.*—Fog-signal disabled August 30; put in working order September 1, 1900.
- Sandy Hook light-vessel, entrance to New York Lower Bay, New York.*—Light-vessel No. 51 withdrawn for repairs and station marked by relief light-vessel No. 16 September 3; light-vessel No. 51 replaced on station and relief light-vessel No. 16 withdrawn October 15, 1900.
- Bush Bluff light-vessel, Elizabeth River, Virginia.*—Light-vessel withdrawn for repairs and station marked by a gas-lighted buoy September 4; light on buoy extinguished December 26, 1900; relighted January 5; extinguished January 21; relighted January 23; light-vessel replaced on station and gas buoy withdrawn March 25, 1901.
- Hen and Chickens Shoal beacon light, Hawk Channel, Florida.*—Structure destroyed and light extinguished September 5; structure reerected and light reestablished March 1, 1901.
- Umatilla Reef light-vessel, seacoast of Washington.*—Light-vessel No. 67 replaced on station and gas-lighted buoy withdrawn September 6; adrift October 23; replaced on station November 6; adrift December 15, 1900; replaced January 8; adrift January 12; replaced January 28, 1901.
- St. Clair Flats Canal Lower Entrance (west side) gas buoy, Lake St. Clair, Michigan.*—Replaced by experimental gas and bell buoy September 7; experimental buoy damaged September 15; put in working order September 27; experimental buoy discontinued and regular gas buoy replaced October 9, 1900.
- Galveston North Jetty light, entrance to Galveston Harbor, Texas.*—Structure destroyed and light extinguished September 8, 1900.
- Entrance Outer gas buoy (formerly North gas buoy), Galveston Bay, Texas.*—Adrift September 8; temporarily discontinued September 21, and station marked by nun buoy; gas-lighted buoy returned to station and nun buoy discontinued October 4; extinguished December 10; relighted December 14, 1900. Extinguished January 7; relighted February 16. Temporarily discontinued June 6 and station marked by nun buoy; replaced June 8 and nun buoy discontinued.
- Entrance Inner gas buoy (formerly South gas buoy), Galveston Bay, Texas.*—Adrift September 8; temporarily discontinued September 21, and station marked by a can buoy; gas-lighted buoy returned to station and can buoy discontinued October 4; light extinguished December 10; relighted December 14, 1900. Taken up February 8; replaced February 9, 1901. Extinguished May 5; temporarily discontinued June 14, and station marked by can buoy; replaced June 19, and can buoy discontinued.
- Inner gas buoy, Galveston Bay, Texas.*—Adrift September 8; temporarily discontinued and station marked by a can buoy September 21; gas-lighted buoy returned to station and can buoy discontinued October 3, 1900. Extinguished May 15; temporarily discontinued June 6, and station marked by can buoy; replaced June 19, and can buoy discontinued.
- Galveston light-vessel No. 28, entrance to Galveston Harbor, Texas.*—Adrift September 8; replaced September 21; light-vessel withdrawn for repairs and station marked by gas-lighted buoy October 7, 1900. Light-vessel No. 28 replaced on station and gas-lighted buoy withdrawn February 2, 1901.

- Fort-Point light-station, entrance to Galveston Harbor, Texas.*—Light extinguished September 8; relighted September 18, 1900.
- Second Turn gas buoy, Galveston Bay, Texas.*—Adrift September 8; temporarily discontinued September 21, and station marked by nun buoy; gas-lighted buoy returned to station and nun buoy discontinued October 3, 1900. Light extinguished January 28; relighted February 9; discontinued and station marked by nun buoy January 14; replaced and nun buoy discontinued January 19, 1901.
- Halfmoon Shoal light-station, Galveston Bay, Texas.*—Structure destroyed and light extinguished September 8, 1900.
- Trinity River beacon light, Galveston Bay, Texas.*—Light extinguished September 8; relighted October 1, 1900.
- Brazos River Jetty light-station, entrance to Brazos River, Texas.*—Light extinguished and fog-signal destroyed September 8, and temporary post-lantern light established 1,200 feet nearer shore September 30; temporary light extinguished October 21, relighted October 22; post lantern changed to lens lantern and moved 300 feet nearer the outer end of the jetty November 17, 1900.
- May Flint wreck light-boat, San Francisco Bay, California.*—Established September 9; discontinued September 11, 1900.
- Sturgeon Bay Canal light-station, Lake Michigan, Wisconsin.*—Characteristic of light temporarily changed from September 10 to September 20, 1900.
- Hatteras Inlet light-station, Pamlico Sound, North Carolina.*—Illuminating apparatus reported disabled in September. Characteristic of light changed October 8, 1900.
- Experimental gas and bell buoy, New York Lower Bay, New York.*—Established September 17; temporarily discontinued October 17; replaced October 26; temporarily discontinued December 24, 1900.
- Knoll bell buoy, entrance to Mobile Bay, Alabama.*—Reported adrift September 18; replaced September 28, 1900.
- Galveston Bar whistling buoy, entrance to Galveston Bay, Texas.*—Adrift September 18; replaced October 28, 1900; found out of position and damaged February 9; repaired and replaced February 18, 1901.
- Ardandhu Wreck gas buoy, Vineyard Sound, Massachusetts.*—Reported extinguished September 20; relighted September 21, 1900.
- Elbow of Ledge gas buoy, No. 14, Delaware Bay, New Jersey.*—Sunk September 20; replaced by perfect buoy September 21, 1900; dragged and extinguished February 9; replaced and relighted same day; adrift February 11; replaced same day; extinguished May 21; relighted May 22, 1901.
- Thieves Ledge whistling buoy, entrance to Boston Harbor, Massachusetts.*—Reported not sounding September 21; put in working order September 23, 1900.
- Broken part of Pollock Rip (N. part) bell buoy, Pollock Rip Slue, Massachusetts.*—Reported not sounding September 21; put in working order September 22, 1900; adrift January 29; replaced January 30; reported not sounding February 27; adrift April 18; replaced April 20, 1901.
- Goose Island Flat gas buoy No. 26, Delaware River, New Jersey.*—Extinguished September 23; relighted September 25, 1900; upset and dragged by ice January 21; replaced March 22, 1901.

- Galloo Island Shoal gas buoy, Lake Ontario, New York.*—Out of position September 25, replaced on station October 1; adrift from station November 12, 1900, and temporarily discontinued; replaced at opening of navigation, April 24, 1901.
- Little River whistling buoy, Little River (Cutler) Harbor, Maine.*—Not sounding September 29; adrift October 16; replaced on station October 23, 1900.
- Off Gurnet Point whistling buoy, entrance to Plymouth, Duxbury, and Kingston, Massachusetts.*—Disabled and not sounding September 29; replaced by perfect buoy October 12, 1900.
- Maurice River Range light-station, Delaware Bay, New Jersey.*—Lights changed from post to lens-lantern lights September 29, 1900.
- Ragged Point Spit gas buoy, No. 9, Potomac River, Maryland.*—Extinguished in September; relighted October 19; extinguished December 25; relighted December 28, 1900; extinguished June 15; relighted June 30, 1901.
- Fauntleroy Rock bell buoy, Crescent City Harbor, California.*—Put in working order October 9; not sounding October 10; adrift December 19, 1900, replaced by perfect buoy April 11, 1901.
- High Point beacon light, Portage River, Michigan.*—Structure destroyed by fire and light extinguished October 11, 1900; light established on temporary structure October 17, 1900; structure rebuilt and light reestablished May 18, 1901.
- Sewall Point Spit beacon light, Hampton Roads, Virginia.*—Structure carried away and light temporarily discontinued October 13; temporary structure and light established November 1, 1900.
- Tail of the Horseshoe light-vessel, Chesapeake Bay, Virginia.*—Light-vessel No. 71 placed on station temporarily October 15, 1900; light-vessel No. 46 permanently moored on station and light-vessel No. 71 withdrawn June 23, 1901.
- La Playa light-station, San Diego Bay, California.*—Fog bell not sounding October 17, 1900.
- Hog Island Channel beacon light, No. 2, Charleston Harbor, South Carolina.*—Carried away October 18; structure rebuilt and light reestablished November 3, 1900.
- Upper Middle gas buoy, Boston Harbor, Massachusetts.*—Light extinguished October 20; relighted October 22, 1900; lantern hung on buoy in the interval; extinguished and adrift February 20, 1901; replaced on station and relighted the same day.
- Swan Island Bar lower post light, Willamette River, Oregon.*—Structure carried away and light extinguished October 21; rebuilt and light reestablished October 31, 1900; carried away and light extinguished January 17; rebuilt and light reestablished February 1, 1901.
- Beacon No. 3 post light, Columbia River, Oregon.*—Structure carried away and light extinguished October 25; rebuilt and light reestablished November 3, 1900.
- Nantucket Shoals light-vessel, off seacoast of Massachusetts.*—Light-vessel No. 66 withdrawn for repairs and station marked by relief light-vessel No. 58 October 26; light-vessel No. 58 adrift December 14; station marked by relief light-vessel No. 9 December 20; light-vessel No. 66 replaced on station and relief light-vessel No. 9 withdrawn December 27, 1900.
- Maumee Straight Channel inner gas buoy, Maumee Bay, Ohio.*—Extinguished October 26; relighted October 30, 1900.

- Long Island Head light-station, Boston Harbor, Massachusetts.*—Changed from a three and one-half order light in old tower to fourth order light in new tower October 30; three and one-half order light reestablished and fourth order light discontinued November 6, 1900.
- Martha Wreck gas buoy, Lake St. Clair, Michigan.*—Established October 30; discontinued November 28, 1900.
- Isle aux Peches range beacon light-station, Lake St. Clair, Michigan.*—Lights discontinued October 31; relighted November 22; front beacon carried away and both lights extinguished December 14, 1900; front structure rebuilt and lights reestablished April 29, 1901.
- Duluth range light-station, Lake Superior, Minnesota.*—Light and fog signal moved to temporary structures November 1, 1900.
- Elizabeth River entrance bell buoy, Hampton Roads, Virginia.*—Dragged out of position November 15; station marked by a spar buoy November 17; replaced November 23, 1900; removed for repairs January 11; replaced on station April 13, 1901.
- Big Sable light-station, Lake Superior, Michigan.*—Fog signal damaged and discontinued November 15, 1900; reestablished at the opening of navigation, 1901.
- Mark Island Ledge bell buoy, Penobscot Bay, Maine.*—Adrift November 16; replaced on station November 23, 1900.
- Noonday Rock bell buoy, entrance to San Francisco Bay, California.*—Not sounding November 19; repaired December 4, 1900; not sounding May 29, 1901.
- South San Francisco range lights, San Francisco Bay, California.*—Extinguished November 20, relighted November 21, 1900; extinguished January 3, relighted January 4, 1901.
- Mare Island light-station, San Pablo Bay, California.*—Light extinguished November 20; relighted November 21, 1900.
- Mare Island Strait Shoal beacon light, Mare Island Strait, California.*—Extinguished November 20, relighted November 21; extinguished December 5, relighted December 7; extinguished December 14, relighted December 15, 1900; extinguished March 6, relighted March 26, 1901.
- Reedy Island range rear light-station, Delaware River, Delaware.*—Extinguished during the night of November 21, 1900.
- Bay State Shoal gas buoy, No. 5, St. Lawrence River, New York.*—Adrift November 21; replaced on station November 24, 1900.
- Gedney Channel electric buoys, entrance to New York Lower Bay, New York.*—Extinguished November 23, relighted November 26; extinguished December 5, relighted December 7, 1900; extinguished February 16, relighted February 18; extinguished March 11, relighted March 13; extinguished April 3, relighted April 8; extinguished April 20, relighted April 24; extinguished April 28, relighted April 29, 1901.
- Southwest Spit electric buoy, No. 12, New York Lower Bay, New York.*—Extinguished November 23, relighted November 26, 1900.
- Chapel Hill Range cut electric buoy New York Lower Bay, New York.*—Extinguished November 23, relighted November 26, 1900.
- Ogdensburg Western Entrance gas buoy No. 2, St. Lawrence River, New York.*—Off its station November 23, discontinued for the winter December 11, 1900.

- East Bank gas buoy, No. 4, New York Lower Bay, New York.*—Damaged by collision and temporarily discontinued November 28, 1900. Replaced on station April 25, 1901.
- Nix Mate bell buoy, Boston Harbor, Massachusetts.*—Missing November 29, replaced on station November 30, 1900.
- Marblehead light-station, Lake Erie, Ohio.*—Changed from fourth-order to lens-lantern light temporarily November 29; fourth-order light reestablished and lens-lantern light discontinued December 21, 1900.
- Mobile Ship Channel light, No. 16, Mobile Bay, Alabama.*—Extinguished December 5, relighted December 6, 1900.
- Mare Island Strait Shoal beacon light, San Pablo Bay, California.*—Extinguished December 5, relighted December 7; extinguished December 14, relighted December 15, 1900; extinguished March 6, relighted March 23, 1901.
- Experimental bell buoy, Boston Harbor, Massachusetts.*—Established December 8, 1900; disabled by ice February 8 and discontinued; reestablished April 19; disappeared May 5, 1901.
- Van Sickle Island post light, Sacramento River, California.*—Blown down and light extinguished December 14; reestablished on temporary structure December 15, 1900; structure rebuilt and light reestablished February 21, 1901.
- Brush Point beacon light, St. Marys River, Michigan.*—Structure carried away by ice and light extinguished December 14, 1900; structure rebuilt and light reestablished May 31, 1901.
- Southwest end of Middle Ground bell buoy, No. 6, Pensacola Bay, Florida.*—Adrift December 19, 1900; replaced on station February 1, 1901.
- Emblem Wreck light, Hampton Roads, Virginia.*—Established December 20, discontinued December 29, 1900.
- Willapa Bay Outside Bar whistling buoy, off seacoast of Washington.*—Adrift December 23, 1900; replaced on station January 6, 1901.
- Swan Island Bar upper post light, Willamette River, Oregon.*—Structure carried away and light extinguished December 24; rebuilt and light reestablished December 21, 1900. Structure carried away and light extinguished January 17; rebuilt and light reestablished February 1, 1901.
- Racine Reef beacon light, Lake Michigan, Wisconsin.*—Light extinguished December 24, relighted December 25, 1900. Extinguished during night of March 5, 1901.
- Northeast Shue Channel whistling buoy (Pollock Rip), Nantucket Sound, Massachusetts.*—Dragged out of position December 26, replaced December 30, 1900. Adrift May 25, replaced on station May 29, 1901.
- San Diego Bay beacon light, No. 2, California.*—Extinguished during night of December 28, 1900.
- San Diego Bay beacon light, No. 3½, California.*—Extinguished during night of December 28, 1900; not exhibited April 4, 1901.
- San Diego Bay beacon light, No. 6, California.*—Extinguished during night of December 28, 1900.
- Diamond beacon light, San Diego Bay, California.*—Extinguished during night of December 28, 1900.
- Fort Bragg Landing whistling buoy, seacoast of California.*—Ashore December 28, 1900; replaced on station January 10, 1901.

- Semiahmoo post light, Washington.*—Structure carried away and light extinguished December 29, 1900; rebuilt and light reestablished January 8, 1901.
- Lime Point light-station, San Francisco Bay, California.*—Light extinguished January 3, 1901.
- Saunders Reef whistling buoy, seacoast of California.*—Adrift, was replaced January 8, 1901.
- Kenosha (Southport) light-station, Lake Michigan, Michigan.*—Light extinguished from January 10 to 25, 1901, for repairs.
- Brigantine Shoal whistling buoy, seacoast of New Jersey.*—Not sounding January 14, replaced by perfect buoy January 18; not sounding February 25, replaced by perfect buoy March 2, 1901.
- Coon Island post light, Willamette River, Oregon.*—Structure damaged and light discontinued January 16, reestablished January 31, 1901.
- Sapelo whistling buoy, seacoast of Georgia.*—Not sounding January 18, replaced by perfect buoy February 6, 1901.
- Frankfort Pierhead range rear-light, station, Lake Michigan, Michigan.*—Extinguished January 20, relighted January 21, 1901.
- East Bank gas buoy, No. 2, New York Lower Bay, New York.*—Damaged by collision and discontinued January 21, replaced on station April 25, 1901.
- Lower Green Spring beacon light, Neuse River, North Carolina.*—Extinguished by collision January 23, structure rebuilt and light reestablished February 22, 1901.
- Purtan Bay post light, No. 1, York River, Virginia.*—Carried away and light extinguished January 25, reestablished February 18, 1901.
- Smith Point light-station, Chesapeake Bay, Virginia.*—Fog trumpet disabled; bell struck by machinery January 26; sounding of trumpet resumed and fog bell discontinued February 4, 1901.
- Broken part of Pollock Rip (N. part) bell buoy, Nantucket Sound, Massachusetts.*—Adrift January 29; replaced January 30; not sounding February 27 and repaired; adrift April 18; replaced April 20, 1901.
- Sherman Rock bell buoy, Lynn Canal, Alaska.*—Adrift January 29, 1901.
- Browns Head light-station, Fox Islands Thorofare, Maine.*—Light extinguished on account of ice February 8; relighted March 9, 1901.
- Rams Head gas buoy, Boston Harbor, Massachusetts.*—Adrift and light extinguished February 20; relighted and replaced February 21, 1901.
- Mobile Ship Channel Second Bend light, No. 1, Mobile Bay, Alabama.*—Extinguished February 24; relighted February 25, 1901.
- Brunswick channel post light, No. 6, Cape Fear River, North Carolina.*—Structure carried away by passing vessel and light temporarily extinguished March 1, 1901.
- Mobile Ship Channel light, No. 14, Mobile Bay, Alabama.*—Extinguished March 8; relighted March 9, 1901.
- Off Point Buchon whistling buoy, seacoast of California.*—Adrift March 11; replaced March 20, 1901.
- Nix Mate gas buoy, Boston Harbor, Massachusetts.*—Dragged out of position and light extinguished by collision March 12; replaced by a perfect buoy and relighted March 13, 1901.

- Mobile Ship Channel light, No. 2, Mobile Bay, Alabama.*—Extinguished March 13; relighted March 14, 1901.
- Frying-Pan Shoals light-vessel, off seacoast of North Carolina.*—Light-vessel No. 1 withdrawn for repairs and station marked by relief light-vessel No. 29 March 15; light-vessel No. 1 replaced on station and relief light-vessel No. 29 withdrawn May 3, 1901.
- Skull Creek beacon light, Port Royal Sound, South Carolina.*—Structure burned and light extinguished March 16; structure rebuilt and light reestablished May 22, 1901.
- Dame Point Dredged Cut post light, St. Johns River, Florida.*—Knocked down by passing vessel and light extinguished March 20; rebuilt and light reestablished April 16, 1901.
- Quarantine Island post light, No. 7½, St. Johns River, Florida.*—Blown down and light extinguished March 28; rebuilt and light reestablished April 16, 1901.
- Bar Point Shoal light-vessel, No. 59, mouth of Detroit River, Michigan.*—Fog-signal changed from steam whistle to bell April 8; sounding of fog-whistle resumed June 21, 1901.
- Western Branch beacon light, Elizabeth River, Virginia.*—Structure damaged and light discontinued April 11, 1901.
- Elizabeth River entrance gas buoy, Hampton Roads, Virginia.*—Extinguished April 12; relighted April 13, 1901.
- Point Delgada bell buoy, seacoast of California.*—Not sounding April 16; repaired May 28, 1901.
- Santa Rosa Sound range front beacon light, Florida.*—Structure carried away and light extinguished April 18; rebuilt and light reestablished May 4, 1901.
- Meadowville post light, James River, Virginia.*—Structure carried away and light extinguished April 22, 1901.
- Grays Harbor outside bar whistling buoy, seacoast of Washington.*—Adrift April 23; replaced May 9, 1901.
- Vidal Shoals channel range light-station, St. Marys River, Michigan.*—Front light changed from lens-lantern to fifth order and characteristic changed; rear light changed from fifth order to lens-lantern and characteristic changed April 24, 1901.
- Ram Island Reef light-vessel, Fishers Island Sound, New York.*—Light-vessel No. 23 withdrawn for repairs and station marked by relief light-vessel No. 20 April 30, 1901.
- Vineyard Sound (Sow and Pigs) light-vessel, Massachusetts.*—Light-vessel No. 41 withdrawn for repairs and station marked by relief light-vessel No. 58 May 1; light-vessel No. 41 replaced on station and relief light-vessel No. 58 withdrawn May 24, 1901.
- Martins Industry light-vessel, off Port Royal entrance, South Carolina.*—Light-vessel No. 53 withdrawn for repairs and station marked by relief light-vessel No. 29 May 4; light-vessel No. 53 replaced on station and relief light-vessel No. 29 withdrawn May 23, 1901.
- Bayou Bonfuya beacon light, Lake Pontchartrain, Louisiana.*—Structure destroyed by fire and temporary post lantern light established May 4, 1901.
- Lake Huron light-vessel station, Michigan.*—Marked by gas-lighted buoy May 11, 1901.
- Outer Island light-station, Lake Superior, Wisconsin.*—Characteristic of light unreliable May 16; repaired in June 1901.

- Poe Reef light-vessel, Straits of Mackinac, Michigan.*—Light-vessel No. 62 withdrawn for repairs and light vessel No. 61 placed on station May 19; light-vessel No. 62 replaced on station and light-vessel No. 61 withdrawn July 1, 1901.
- Snow Marsh Channel range front post light, Cape Fear River, North Carolina.*—Structure carried away and light extinguished May 21; rebuilt and light reestablished May 29, 1901.
- Herson Island Middle light, No. 8, St. Clair River, Michigan.*—Structure carried away by ice at the opening of navigation; rebuilt and light reestablished May 21, 1901.
- Goodes Rock lower post light, James River, Virginia.*—Structure carried away and light extinguished May 24; rebuilt and light reestablished June 3, 1901.
- Point Hueneme light-station, seacoast of California.*—Extinguished during night of May 26, 1901.
- La Du post light, Columbia River, Washington.*—Structure carried away by freshet and light extinguished May 30, 1901.
- White Island Ledge bell buoy, Isles of Shoals, New Hampshire.*—Not sounding May 31, 1901.
- Boston light-vessel, Massachusetts.*—Light-vessel No. 54 withdrawn for repairs and station marked by relief light-vessel No. 58 May 31; light-vessel No. 54 replaced on station and relief light-vessel No. 58 withdrawn June 25, 1901.
- Superior Bay post lights, Lake Superior, Wisconsin and Minnesota.*—Carried away by ice during the winter; rebuilt and lights reestablished in June, 1901.
- St. Louis Bay post lights, Lake Superior, Minnesota.*—Carried away by ice in the winter; rebuilt and lights reestablished in June, 1901.
- Fort Point light-station, San Francisco Harbor, California.*—Characteristic of light temporarily changed during night of June 2, 1901.
- Experimental gas buoy, New York Upper Bay, New York.*—Established June 8, 1901.
- Off Piedras Blancas whistling buoy, seacoast of California.*—Not sounding June 8; repaired June 18, 1901.
- Point Abbaye Shoal (N.) bell buoy, Lake Superior, Michigan.*—Replaced on station June 11, 1901.
- Macedonia Wreck gas buoy, off seacoast of New Jersey.*—Discontinued June 15, 1901.
- Lower Hay Lake Cut East Side Middle float light, No. 12, St. Marys River, Michigan.*—A post-lantern light June 15, 1901.
- Entrance bell buoy (Orion Shoal), Nantucket Sound, Massachusetts.*—Not sounding June 17; replaced by a perfect buoy June 19, 1901.
- Seventeen-Foot Knoll gas buoy, No. 34, Delaware River, New Jersey.*—Extinguished June 19; relighted June 24, 1901.
- Peaked Hill Bar whistling buoy, seacoast of Massachusetts.*—Not sounding June 20; repaired June —, 1901.
- Hereford Inlet Shoals bell buoy, seacoast of New Jersey.*—Not sounding June 24, 1901.
- Duluth Harbor Basin post light, No. 1, Lake Superior, Minnesota.*—Structure carried away and light extinguished June 25; rebuilt and light reestablished June —, 1901.
- Rains Dock gas buoy, No. 18, St. Marys River, Michigan.*—Damaged and light extinguished June 27; relighted June 30, 1901.

Aids to navigation maintained by Light-House Board, June 30, 1901.

Aids.	First district.	Second district.	Third district.	Fourth district.	Fifth district.	Sixth district.	Seventh district.	Eighth district.	Ninth district.	Tenth district.	Eleventh district.	Twelfth district.	Thirteenth district.	Fourteenth district.	Fifteenth district.	Sixteenth district.	Atlantic coast.	Pacific coast.	Lake coast.	Western rivers.	Total, 1900.	Total, 1901.	Increase or decrease.
Electric lights.....	2	3	2	5	7	7	8	2	1	1	2	9	9				5	18			9	9	
First-order lights.....	7	4	5														40				58	58	
Second-order lights.....	5	3	2			1	6	3	9	5	2	3	2				36	6	3		20	20	
Third-order lights.....		1	11	3		4	6	6	9		9	3					8		23		63	64	+ 1
Three-and-a-half-order lights.....																					11	11	
Fourth-order lights.....	20	23	48	13	44	5	6	13	35	24	34	11	8				172	19	93		283	284	+ 1
Fifth-order lights.....	26	16	20	8	24	4	1	14	15	13	17	5	2				113	7	45		165	165	
Sixth-order lights.....	1	6	35	2	8	6	1	1	20	16	11						158		47		108	105	- 3
Lens lanterns.....	8	3	10	12	22	13	50	32	22	20	54	14	12				150	26	96		198	272	+ 74
Range lenses.....			6	8	2												16				16	16	
Reflectors.....	2	11	1	8	4	24		2	1	1	97	14	110	526	522	374	52	124	107	1,422	2,048	+ 21	
Post lanterns in position.....	6	10	147	8	60	143	4	38	10		3	1	2				416	107	10	1,422	2,048	+ 21	
Light-vessels in position.....		10	8	5	4	3		2	4	3							32	8			44	45	+ 1
Electric-lighted buoys.....			11														11				11	11	
Gas-lighted buoys.....		8	11	3	3			4	10	23	29						29		62		82	91	+ 9
Total lighted aids.....	77	99	317	75	178	209	77	117	130	106	260	58	145	526	522	374	1,149	203	496	1,422	3,163	3,270	+ 107
Fog-signals operated by steam, hot-air, or other engines.....																							
Fog-signals operated by clockwork.....	13	12	29	7	7	2		1	36	9	31	17	15				71	32	76		172	179	+ 7
Day beacons.....	28	11	60	7	66	3		14	7	6	5	11	4				189	15	18		221	222	+ 1
Whistling buoys.....	115	73	47	3	12	47	61	61			48	46	4				419	94		239	496	752	+ 256
Bell-buoys.....	15	12	6	4	1	8	3	5			16	8					53	24			73	77	+ 4
Other buoys.....	21	30	29	6	4	12	6	3	1		8	11	6				101	17	4		120	122	+ 2
Total unlighted aids.....	701	554	579	149	1,115	290	271	124	101	162	368	75	291				3,783	366	631		4,749	4,780	+ 31
Total number of aids.....	898	682	749	176	1,206	362	341	208	145	177	407	178	370	4	178	57	4,616	548	729	239	5,831	6,132	+ 301
Total number of aids ..	970	781	1,066	251	1,383	571	418	325	275	283	667	236	515	530	700	431	5,765	751	1,225	1,661	3,994	9,402	+ 408

Appropriations made at the second session of the Fifty-sixth Congress for the Light-House Establishment (act of March 3, 1901).

Supplies of light-houses	\$475,000
Repairs of light-houses	655,000
Salaries of light keepers	785,000
Expenses of light-vessels	475,000
Expenses of buoyage	550,000
Expenses of fog signals	175,000
Lighting of rivers	300,000
Survey of light-house sites	1,000
Oil houses for light-stations	10,000
Porto Rican light-house establishment	75,000
Maintenance of lights on channels of Great Lakes	4,000

SPECIAL WORKS.

Third district.

Fort Wadsworth light and fog-signal station, New York	12,900.00
Norwalk Harbor lighted beacons, Connecticut, completing	400.00
Pecks Ledge, Norwalk Harbor, Connecticut	10,000.00
Long Beach day beacon, Norwalk Harbor, Connecticut	2,500.00
Tender for the inspector, Third light-house district, completing	62,500.00
Staten Island depot, New York	25,000.00

Fourth district.

Grubbs Landing beacon, Delaware River, Delaware	8,000.00
Port Penn range, Reedy Island range, Finns Point range, Delaware River, New Jersey, reestablishment	60,000.00

Fifth district.

Hambrook Bar beacon light, Maryland, and range lights to guide into harbor of Cambridge, Maryland	10,000.00
Point No Point light and fog signal, Maryland	65,000.00
Northwest Point Royal Shoal light-station, North Carolina, rebuilding ..	30,000.00

Sixth district.

Cape Fear light-station, North Carolina, completing	35,000.00
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Seventh district.

Tender for the engineer, Seventh light-house district	85,000.00
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Eighth district.

Sabine Bank light and fog-signal station, Texas, completing	40,000.00
Tender for the Eighth light-house district	125,000.00

Tenth district.

Toledo Harbor light and fog signal, completing	52,500.00
Tender for the Tenth light-house district	120,000.00

Twelfth district.

Table Bluff light-station, California, telephone line	1,408.44
Point Dume light and fog-signal station, California	63,000.00
Relief light-vessel Twelfth and Thirteenth light-house districts, Pacific coast	90,000.00

Thirteenth district.

Admiralty Head, Washington, removal and reconstruction of light-house buildings	12,000.00
Light-house and fog-signal stations in Alaskan waters	200,000.00
Tender for the Thirteenth light-house district, completing	20,000.00

Sixteenth district.

Tender for the Sixteenth light-house district, completing	30,000.00
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NEW WORKS AUTHORIZED.

Congress authorized, by act approved on February 15, 1893, the establishment of a number of light-stations at an aggregate cost of nearly half a million dollars, but made no appropriation at that time for their construction. Since then from time to time appropriation has been made for the erection of many of them. The following is a list of the light-stations remaining for which no appropriation has yet been made, with the maximum amount which each may cost:

Bay State Shoal lights, New York	\$800
Fairport Harbor fog-signal, Ohio	4,300
Lorain Harbor (Black River) fog-signal, Ohio	4,300
Sand Hills light-house, Michigan	20,000
Bayfield light and fog-signal, Wisconsin	5,000
Pats (or Hat) Point light and fog-signal, Minnesota	15,000
Little Gull Island light and fog-signal, Michigan	20,000
Peshtigo Shoal, Green Bay, Wisconsin	10,000
Wilson Harbor light, New York	2,500
Big Oyster Bed Shoal light and fog-signal, New Jersey	25,000
Deer Point light, Florida	1,000
New York Slough light and fog-signal, California	10,000
Willamette River, Oregon, 25 beacon lights and buoys between Salem and Portland	5,000

Congress authorized, by the act approved on June 6, 1900, the reestablishment of the range lights on the Delaware River known as Finns Point range, Reedy Island range, and Port Penn range, at a cost not exceeding \$90,000, but made no appropriation therefor.

By the act approved March 3, 1901, \$60,000 was appropriated for the reestablishment of these ranges.

Congress also, by act approved June 6, 1900, authorized the Secretary of the Treasury to enter into a contract for rebuilding the Sand Island light and fog-signal station, Alabama, at a total cost not to exceed \$65,000, at any time he may consider such rebuilding to be necessary because of threatened destruction of the present station by the encroachment of the sea, but made no appropriation therefor.

By the act approved February 12, 1901, Congress authorized the establishment of a first-order light at or near Hillsboro Point, Florida, at a cost not exceeding \$90,000, but made no appropriation.

A detailed statement of the work done in each of the sixteen light-house districts is made in the body of the report under specified headings.

SUPPLIES OF LIGHT-HOUSES.

The Board estimates that \$502,886 will be needed for providing supplies for light-houses during the coming fiscal year, and it recommends that an appropriation of this amount be made therefor.

REPAIRS, ETC., OF LIGHT-HOUSES.

As stated last year, a large annual expenditure for repairs will be needed until the older light-house stations have been brought up to the standard of modern requirements. Restoration, repair, and improvement of light-house towers and structures and of illuminating apparatus; the substitution of new for old types of lamps, and of improved methods of rotation for the old devices in the case of flashing lights are required, as the old wear out or become inefficient under changed conditions. At many of the older stations the light-house

structures and the auxiliary buildings for the occupation and use of the keepers are not only dilapidated, but out of date, and require practical reconstruction. It was the early practice of the Light-House Board to provide for the family of the principal keeper, and encourage employment of assistant keepers without families. This practice is no longer considered advisable, since keepers are best obtained by promotion of assistant keepers, and the latter should be encouraged to remain long in the service, in order to qualify themselves for the position of keeper. At some stations where a single keeper was originally sufficient, and was alone provided for, assistants have been made necessary by increase of duties, due to the introduction of fog-signals or other improvements in the station. In such cases there is crowding and discomfort for the families of the employees, and a lack of the privacy and comforts of domestic life which must be provided for a desirable class of employees.

It is proposed to effect the necessary improvements in the older stations progressively by a moderate annual expenditure.

It is estimated that \$750,000 will be required during the fiscal year to end June 30, 1903, and it is recommended that an appropriation of that amount be made therefor.

SALARIES OF LIGHT-HOUSE KEEPERS.

On March 3, 1901, Congress appropriated \$785,000 for salaries, fuel, rations, rent of quarters where necessary, and similar incidental expenses, of not exceeding 1,600 light-house and fog-signal keepers and laborers attending other lights, for the fiscal year ending on June 30, 1902. On June 30, 1900, there were 1,243 light-stations; on June 30, 1901, there were 1,306; on June 30, 1902, it is believed there will be 1,316, and on June 30, 1903, it is expected that there will be 1,326 light-stations in operation. It is reasonable to suppose that Congress will make appropriations for additional light-houses, which the Board has recommended should be built. The Board has recommended the establishment of a number of fog-signals at numerous existing stations, and it is probable that the number will be increased at the next session of Congress. It will be necessary to employ another keeper at each station to which a fog-signal is added. The Board therefore recommends that it be authorized to employ not exceeding 1,700 light-house and fog-signal keepers and laborers attending other lights, if needed, and that an appropriation of \$833,000 be made therefor.

EXPENSES OF LIGHT-VESSELS.

Congress appropriated \$475,000 to defray the expenses of light-vessels during the fiscal year to end June 30, 1902. The appropriation will barely meet the needs of the service during that time. There are now 45 light-vessels on stations and 8 light-vessels held in reserve ready in case of need to be put on stations to take the place of those for the time being under repairs. Three light-vessels are being built. The Board has asked that appropriations be made for building four more. It costs about \$6,000 a year to maintain a first-class light-vessel. The wear and tear on the older light-vessels increases with their age, and it costs more each year to keep them in repair. While the new light-vessels, when built, are fitted with all the modern improvements, the Board is fitting certain of the older light-vessels with fog-signals and like improvements to bring them up to its present standard. The cost

of labor and material is largely increased since last year. The Board estimates, therefore, the expenses of light vessels for the ensuing fiscal year will be at least \$525,000, and it is recommended that an appropriation of that amount be made therefor.

EXPENSES OF BUOYAGE.

Congress appropriated \$550,000 to defray the expenses of buoyage during the fiscal year to end on June 30, 1902. It is estimated that the same amount will be required to defray the expenses of buoyage during the coming fiscal year. The Board therefore recommends that an appropriation of \$550,000 be made for this purpose.

FOG-SIGNALS.

As stated last year, the limited appropriation for this purpose has not permitted the general renovation and improvements that are so much needed in this important class of aids to navigation, though considerable progress has been made. Improved apparatus has been installed at several stations, preserving the system of interchangeability between the various members of the duplicate sets of apparatus required in each case. The Board is of the opinion that the change from the old-style steam engine, which consumes a great deal of steam, to the Crosby automatic engine, which operates by clockwork and consumes steam only for winding the clock and opening the valve, is desirable and should be made, at least as rapidly as the old engines become unserviceable; that the replacing of steam boilers by some form of explosive engine with an air compressor is desirable for all stations where the water supply is precarious, and may perhaps be found advantageous by experience in all cases when the present installation of steam boilers becomes unserviceable; that in view of the probability that steam will be replaced by compressed air quite generally for fog-signals, it is not desirable to enter at once upon any considerable expenditure for perfecting the installation of steam boilers.

The average time of getting up steam with the old style of boilers is about forty-five minutes. With heaters kept properly tended this time can be greatly reduced with a small expenditure of coal. The importance of raising steam quickly is such that it is proposed that heaters be attached to all fog-signals operated by steam.

It is estimated that \$190,000 will be required for all expenses connected with fog-signals, and it is recommended that an appropriation of that amount be made therefor.

LIGHTING OF RIVERS.

The three appropriations of \$300,000 made by the acts approved March 3, 1899, June 6, 1900, and March 3, 1901, were barely sufficient to maintain the post lights which had already been established, but they were insufficient to enable the Board to establish and maintain other lights, which it is evident are much needed. It is estimated that \$330,000 will be needed to defray the expenses of lighting rivers during the next fiscal year, and it is recommended that an appropriation of this amount be made therefor.

NEW LIGHT-STATIONS AND DEPOTS.

Estimates for special appropriations for new light-stations and depots have been revised with particular care to bring them up to

date and make them conform to the actual needs of navigation in the various districts throughout the coasts and inland waters.

The Board desires to commend especially as a much-needed aid to navigation the establishment of a first-order light at Hillsboro Inlet, Florida, to complete the system of lighting on the South Atlantic coast by filling the long gap which now exists between Jupiter Inlet and Fowey Rocks. The construction of this light-house was authorized by act of February 12, 1901, at a cost not to exceed \$90,000, but no appropriation was made therefor.

NEW LIGHT-VESSELS.

The Board has recommended in the proper places in the body of this report that appropriations be made for building a light-vessel for Cape Lookout Shoals, a steam light-vessel for Martins Reef, Lake Huron; a relief light vessel for the Ninth and Eleventh Light-House districts, and a steam light-vessel, with all modern improvements, for use at Blunts Reef, off Cape Mendocino, on the Pacific coast. Each is much needed, but attention is especially invited to the urgent necessity for the light-vessel for Cape Lookout Shoals.

NEW TENDERS.

The Board has recommended that appropriations be made for building four new tenders, and also that further appropriations be made for three tenders for which partial appropriations have already been made. It was recommended in the Board's last three annual reports that a steam tender be built for use in engineering and construction work in the Twelfth light-house district, with headquarters at San Francisco, Cal. This recommendation is renewed.

The Board renews its recommendation of last year that a small steel steamer be provided to attend the lights in Mobile, Ala., Ship Channel. For several years it has been necessary to charter tugs to care for the lights, and it is deemed that it will be in the interests, not only of commerce and navigation, but of economy, if the recommendation of the Board is carried out.

The Board also renews its recommendation of last year for the construction of a steam tender for use in St. Marys River and adjacent waters, Michigan. In consequence of the increased commerce passing through this river and the great necessity for keeping its aids to navigation in the best possible condition, an iron steamer drawing not more than 6 feet of water and a specially strengthened bow for ice crushing is required.

Partial appropriations were made by the act approved on March 3, 1901, for tenders for the inspector of the Ninth light-house district and for the engineer of the Ninth light-house district. Further appropriations will be needed to satisfy the contracts authorized by that act.

Efforts have been made to carry on the Porto Rican light-house service by borrowing occasionally a small vessel from the Navy Department and by making temporary use of a light-house tender belonging in the Seventh light-house district. The results have been so unsatisfactory that the Board has been compelled to recommend that an appropriation of \$125,000 be made to provide a suitable seagoing tender to be devoted to both construction and maintenance duty in the light and buoy service in Porto Rican waters, and especially for carrying light-house supplies and material from the mainland to the islands.

OIL HOUSES FOR LIGHT-STATIONS.

Under this appropriation oil houses have been completed during the year at the following-named stations:

First district.—Mount Desert, Maine; Great Duck Island, Maine.

Second district.—Nobska Point, Massachusetts; Dimpling Rock, Massachusetts.

Third district.—Rose Island, Rhode Island; Conanicut Island, Rhode Island; Pomham Rocks, Rhode Island; Plum Island, New York; Cold Spring Harbor, New York; North Brother Island, New York; Romer Shoal, New York.

Fourth district.—Maurice River, Delaware Bay, New Jersey.

Fifth district.—Watts Island, Virginia.

Sixth district.—Mount Pleasant Range, South Carolina.

Eighth district.—Bayou St. John, Louisiana.

Ninth district.—Manistee, Michigan; Escanaba, Michigan; Squaw Point, Michigan, and Grassy Island, Wisconsin.

Tenth district.—Sacketts Harbor, New York; Cleveland, Ohio.

Eleventh district.—Charity Island, Michigan; Portage Range, Michigan.

An appropriation of \$20,000 is recommended for continuing the work of erecting oil houses during the fiscal year 1903; and if the amount is made available, the work of providing these houses at established stations where they are required can be brought well along toward completion. This work has been in progress for a number of years, and it would be conducive to economy to provide at once for its completion. All new stations are provided with oil houses under the special appropriation for each station, and further appropriations for oil houses will not be required after the older stations have been provided for. Oil houses are needed for such storage of oil at points remote from the light-house structures as will minimize the danger of destruction of the buildings by fire.

NEWLY ACQUIRED POSSESSIONS.

Since May 1, 1899, the Porto Rican light-house service has been under the charge of the Light-House Board. Congress, by the act approved June 6, 1900, appropriated \$60,000 to maintain existing aids to navigation and complete the construction of the Mona Island light, near Porto Rico, and those on adjacent islands. By the act approved on March 3, 1901, an appropriation was made of \$75,000 to maintain aids to navigation in Porto Rican waters. As the buoyage system for these waters will have to be almost entirely reconstructed, it is estimated that an appropriation of \$90,000 will be needed to do this and to maintain the existing Porto Rican light-house system during the coming year.

The following recommendation made in the Board's last annual report is renewed:

It is also recommended that \$25,000 be appropriated to maintain the Hawaiian light-house establishment in case it should be turned over to the Light-House Board.

ALASKAN WATERS.

The following statement, made in the Board's last annual report, is repeated:

In view of the great extent of navigable waters in Alaska, and of the increased traffic in this region, particularly between Puget Sound points and those along Lynn Canal, it seems so desirable that the present Thirteenth district should be divided,

making two districts of it, that special recommendation will be made to Congress at its next session to that end, the new district to include Alaskan waters only, with headquarters at Sitka.

Congress, by the act approved March 3, 1899, appropriated \$100,000 for the construction of a tender especially adapted for use in these waters. This amount being found insufficient, Congress, by the act approved June 6, 1900, authorized a contract for the construction of this tender, at a cost not exceeding \$120,000. A contract was made by which the steamer was to be built in twelve months from its date, which was in February, 1901. Owing, however, to strikes and other difficulties, it is feared that the vessel will not be delivered quite as soon as it should be, but the work is being pushed with great vigor.

By the acts approved June 6, 1900, and March 3, 1901, \$300,000 were appropriated to establish light-houses and fog-signals in Alaskan waters. The inspector and engineer of the Thirteenth light-house district started on June 23, 1900, for Alaska to inspect the proposed light-house sites, and on their return in August they submitted their report, a summary of which is given elsewhere, in which it was recommended that 12 light-houses and fog-signals be established in southeastern Alaska, and that 4 be established in western Alaska.

The Light-House Board, in December, 1900, directed that detailed plans and specifications be made for the work proposed at Southeast Five Finger Island, and Sentinel Island, in southern Alaska. Contract was made for the establishment of a light-house and fog-signal station at Southeast Five Finger Island and another at Sentinel Island, both of which stations it is hoped will be in operation before the end of this calendar year.

In March, 1901, the Board decided that the work of establishing light and fog-signal stations in Alaskan waters should be continued, according to the following estimates so far as the appropriation admits, in the following order:

Southeast Five Finger Island, southeastern Alaska.....	\$32, 900
Sentinel Island, southeastern Alaska.....	31, 500
East of Scotch Cap, western Alaska.....	40, 800
Lincoln Rock, southeastern Alaska.....	45, 000
Mary Island, southeastern Alaska.....	32, 400
Cape Saritchey, western Alaska.....	45, 900
Tree Point, southeastern Alaska.....	36, 213
Ulakhta Head, western Alaska.....	90, 000
Guard Island, southeastern Alaska.....	30, 500
West of Scotch Cap, western Alaska.....	40, 800
	<hr/>
	426, 013
Amount appropriated by the act of June 6, 1900, and by the act of March 3, 1901.....	300, 000

Amount needed to do the above-named work in addition to the amount appropriated.....	126, 013
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The Board recommends that this amount be appropriated to enable it to finish the establishment of the ten lights and fog-signals in question.

The Board decided that detailed plans and specifications should be prepared for the establishment of as many of these light and fog-signal stations as can be provided for in the appropriation already made. Plans and specifications for the stations to be established at east of Scotch Cap, western Alaska, and at Lincoln Rock, southeastern Alaska, are well under way.

WIRELESS TELEGRAPHY.

The following statement made in the Board's last annual report is repeated with renewed emphasis:

The Board has continued to watch with interest the development of the use of the wireless telegraph during the year, and hopes that it may be able soon to install the apparatus, so that communication may be maintained between some of the light-vessels and the shore in the interests of the Light-House Service.

The Board proposes, with the consent of Congress, to establish either wireless telegraphy or telephony, or both, between certain light-vessels and certain light-houses, as may be found most desirable, and it estimates that \$25,000 can be very judiciously expended therefor during the coming year, and therefore recommends that an appropriation of this amount be made.

Permission was given to one of the great New York daily newspapers to connect the Nantucket Shoals light-vessel with the island of Nantucket by the Marconi system for experimental purposes, with apparent satisfactory results.

While the Board does not propose to either gather or disseminate marine news, it is quite desirous in the interests of commerce and navigation as well as of economy to be put into early and quick communication with its outlying light-vessels and light-houses, and it is for this purpose alone that it asks an appropriation to enable it to install a wireless system of telegraphy between such points in the Light-House Establishment as shall seem to be most necessary.

INCREASED ACCOMMODATIONS FOR THE OFFICES OF THE LIGHT-HOUSE BOARD.

The following recommendation made in the Board's last four annual reports is renewed:

In previous years recommendation has been made and several times repeated that an appropriation be granted for a separate building for the offices of the Board. Separate buildings have been provided for a number of bureaus of the Treasury and other Departments whose requirements in this respect are certainly not greater than those of the Light-House Establishment.

The urgent demands for sufficient funds to maintain the direct aids to navigation and the conditions necessitating that appropriations be limited to the lowest possible figures have resulted in omitting the recommendation for a new building for the past few years. The business of the Board's office has, however, continued to increase, and the crowded condition and general inadequacy of the rooms now occupied, which are scattered about in various localities in the Treasury Department building, now require that the recommendation for proper office accommodations be renewed and in still more urgent terms. If an appropriation for this purpose be not deemed expedient, possibly a suitable building could be rented, or a building already owned by the Government might be made available for the purpose. An additional advantage would result from procuring necessary accommodations for the Light-House Board elsewhere in relieving to some extent the pressure for increased office room for other bureaus in the Treasury building.

INCREASE IN CLERICAL FORCE.

An additional clerk, to be paid at the rate of \$720 a year, was provided by the act of March 3, 1901.

The Board now has about 1,500 light-keepers and some 1,300 other employees, such as officers and crews of its 47 light-house tenders, its 53 light-vessels, and employees in its district offices, its shops, and at its light-house depots. There is also a force of some 1,400 laborers in charge of about 1,800 post lights on the rivers. Frequent changes take place among the employees, especially among those of the lower

grades. These changes consist of appointments, transfers, promotions, reductions, deaths, resignations, and dismissals. Every such change, under civil-service rules, makes the writing of at least six letters necessary, as well as various entries on the books and in the records of the Light-House Establishment. The Board, finding it impossible to keep up with this increase of work with its regular force, obtained a temporary detail of three clerks from other offices. This temporary force or its equivalent can not now be dispensed with if the current work is to be kept up.

The general work of the establishment has increased largely from year to year. This is caused by the increase in the number of aids to navigation, each of which makes an increase in the work of maintaining them, and hence in the clerical work of the establishment. The increase in the clerical force has not been in proportion to the increase in the clerical work brought about by this increase in the number of the various aids to navigation.

The following tabular statement will show some of this increase in the number of aids to navigation during each of the past ten years:

Aids to navigation.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.
Light-houses and beacon lights.....	932	951	953	1,014	1,091	1,116	1,179	1,199	1,243	1,306
Light-vessels.....	36	39	45	45	46	47	50	53	52	53
Post-lights.....	1,692	1,750	1,777	1,793	1,765	1,779	1,739	1,775	1,783	1,827
Tenders.....	38	40	40	38	39	41	44	47	47	47
Beacons.....	420	419	414	424	422	424	439	476	496	752
Buoys.....	4,446	4,491	4,608	4,732	4,875	4,934	4,959	4,977	5,035	5,081
Light-keepers.....	1,136	1,139	1,190	1,203	1,253	1,292	1,339	1,373	1,394	1,420
Other employees.....	870	821	890	1,078	1,108	1,144	1,226	1,249	1,256	1,428
Laborers at post lights.....	11,571	11,503	1,352	1,364	1,360	1,859	1,356	1,363	1,382	1,574
Clerical force, exclusive of drafts- men, messengers, etc.....	21	21	21	21	21	21	21	21	23	25

¹ Several persons were employed at the same light at different times during the year.

From 1892 to 1899 a number of clerks were detailed from other offices to the Office of the Light-House Board. The number so detailed varied, but was never less than 5 at any one time. In 1898 and 1899 the number was gradually decreased, the exigencies of Department work requiring that they be used elsewhere, until in 1899 this office was left with only the clerks on its own pay roll, 21 in number. The Board meantime, seeing the improbability of its being able to obtain further assistance from detailed clerks, asked that the number of its own clerks be increased.

The following appeared in the preface to the Board's annual report for 1897:

The clerical force employed in the Office of the Light-House Board has not been increased for many years. During this time the work that the force is required to do has been more than doubled.

The Department has recognized the fact that the Board was unable to do this work with the force provided by law, and it has detailed clerks to it from other offices from time to time. The detail has been decreased from 5 clerks, as it was several years ago, down to 1 clerk, as it now is.

The Board has recommended in its annual estimates that the clerical force be increased, as it feels unless this is provided that it will be unable to keep its work up to its own high standard.

In 1900 two clerks, paid each at the rate of \$1,000 a year, were added to its force, and in 1901 one paid at the rate of \$840 and another at the rate of \$720 were added. Meantime the work of the office, as before stated, was largely increased, especially by the addition of the Porto Rican light-house system to that of our own, and the Board was again

forced to ask detailed assistance. There are to-day temporarily in this office four detailed clerks, and without their help it would be impossible to keep up the current work of the office. The Board therefore now recommends that the proper measures be taken to add to its force three additional clerks of class 1.

The main reason for asking action which looks to the increase of the pay of certain of its employees, apart from its tardy justice to them, is that this office is constantly being drained of its trained young men by other offices which can offer them the promotion they can not gain in this office, the pay in these other offices being greater in each instance for the same kind of work than in this office.

PAN-AMERICAN EXPOSITION.

The Light-House exhibit at the Pan-American Exposition is said to be the best yet made at any exposition in the United States, and shows various recent improvements in lamps, in the revolving machinery for lens apparatus, and in fog-signals.

The following is a list of articles exhibited:

MODELS OF BUOYS.

Gas-lighted buoy.—Pintsch system.

Electric-lighted buoy.—Similar to those used to light Gedney Channel, entrance to New York Bay. This is a full-sized top of a buoy, with a sample of the cable used.

Whistling buoy.—Courtenay system.

MODELS OF LIGHT-VESSELS.

Complete model of a light-vessel, No. 40, Five Fathom Bank, New Jersey.

Model of half light-vessel No. 39, Brenton Reef, Rhode Island.

MODELS OF LIGHT-HOUSES.

Forvey Rocks, Florida, light-station.—The foundation built by Col. Jared A. Smith, Corps of Engineers, U. S. A. The station was completed by Maj. W. H. Heuer, Corps of Engineers, U. S. A.

Spectacle Reef, Michigan, light-station, Lake Huron.—Built by Col. O. M. Poe, Corps of Engineers, U. S. A.

Minots Ledge, Massachusetts, light-station.—Built by Capt. B. S. Alexander, Corps of Engineers, U. S. A.

Southwest Pass, Louisiana, light-station.—Built by Lieut. Col. A. N. Damrell, Corps of Engineers, U. S. A.

Brandywine Shoal, Delaware, light-station.—Built by Maj. Hartman Bache, Corps of Engineers, U. S. A.

Sturgeon Bay Canal, Wisconsin, light-station.—Designed by Maj. John Millis, Corps of Engineers, U. S. A.; built by Maj. M. B. Adams, Corps of Engineers, U. S. A.

Coffins Patches light-station.

These models show examples of difficult light-house engineering.

ILLUMINATING APPARATUS.

One first-order lens, flashing, 24 panels; designed to make one complete revolution in 4 minutes, and showing a white flash every ten seconds.

This lens is supported on chariot wheels, made by the Henri Lapaute Co., of Paris, France.

One third-order lens, flashing alternately red and white at intervals of ten seconds.

This lens was made by Messrs. Barbier & Benard, of Paris, France, from a design prepared by Lieut. Col. D. P. Heap, U. S. A. It contains 3 flash panels—2 white and 1 red—so arranged that the intensity of the light from each panel is of the same power and the intervals between the flashes are of the same length. This lens is supported on ball bearings and revolved by a clock underneath, according to a method devised by Lieutenant-Colonel Heap. After the exposition is closed this lens will be installed at the light-house in process of erection at Toledo Harbor, Ohio.

The lamps exhibited with the above lenses are known as "air-pressure" lamps, the oil being forced to the burner by air pressure, according to a system devised by Lieutenant-Colonel Heap.

One 6-panel, fourth-order lens, flashing, made by Messrs. Chance Bros. & Co., of England; on ball bearings, with new style lamp, pedestal, and clock, according to the system devised by Lieutenant-Colonel Heap.

This lens is shown in operation in a full-sized light-house and in a fourth-order circular lantern.

One five-day lens lantern.

This is a type of light to be placed on a post. It gives a very brilliant light, and will burn five days without attention.

The five-day attachment was devised by Lieutenant-Colonel Heap.

One post lantern, eight-day, white, with plain glass globe.

One post lantern, eight-day, red, with plain glass globe.

These lanterns are used when it is not necessary to see the light for a greater distance than 2 miles. They will burn eight days without attention, on the same principle as the five-day lens lantern.

One set (3) of light-vessel lamps mounted on a mast, so arranged that the illuminant may be either oil or electricity.

Fourth and fifth order lamps, invented by Lieutenant-Colonel Heap and the late Mr. Joseph Funck, foreman of lamp shop, Light-House Depot.

These lamps are of 52 and 38 candlepower, respectively, and are in use in light-houses of the fourth and fifth order throughout the United States.

Old-style lens and lighting apparatus, showing the former state of the art, including the lens used at Lime Rock light-station, Newport, R. I., of which Ida Lewis, the noted female life-saver, has been the keeper for many years.

One old style light-vessel lamp for burning lard oil.

One locomotive headlight lantern with lamp.

One first-order brass wick box.

One first-order plunger lamp, complete with damper, tube, etc.

One old-fashion fountain lamp with parabolic reflector and reservoir.

One fifth-order lamp with its stand.

Two fourth-order lamps with their stands.

One keeper's table lamp.

One first-order Henri Lapaute lamp.

One first-order mechanical lamp.

One third-order Meads hydraulic lamp.

FOG-SIGNAL APPARATUS.

One Gamewell fog-bell striking machine, complete.

One Cole fog-bell striking machine.

One Gamewell fog-bell 10,000-blow machine, complete, with bell and electric attachment for starting and stopping.

The above named were loaned by the Gamewell Fire Alarm Telegraph Company, of Boston, Mass. The last named machine will strike 10,000 blows with one winding.

One bell, loaned by the Henry McShane Manufacturing Company, of Baltimore, Md.

One Stevens machine, complete, loaned by Mr. George M. Stevens, of Boston, Mass.

One automatic siren, loaned by Messrs. Schaeffer & Budenberg, of New York, N. Y.

One automatic siren, loaned by Messrs. A. & F. Brown, of New York, N. Y.

One 13-horsepower Hornsby-Akroyd oil-burning engine, with an air compressor on the same bedplate, loaned by the De La Vergne Refrigerating Machine Company, of New York, N. Y., to operate the above-named sirens. One high and one low pressure air tank and a Mason reducing valve, used in connection with the sirens.

One Daboll fog trumpet (reed box only), made at the Light-House Establishment lamp shop, at the General Light-House Depot.

One Crosby automatic signal in duplicate, for use with whistles and sirens, to give them the characteristics desired; simplified and improved by Lieutenant-Colonel Heap.

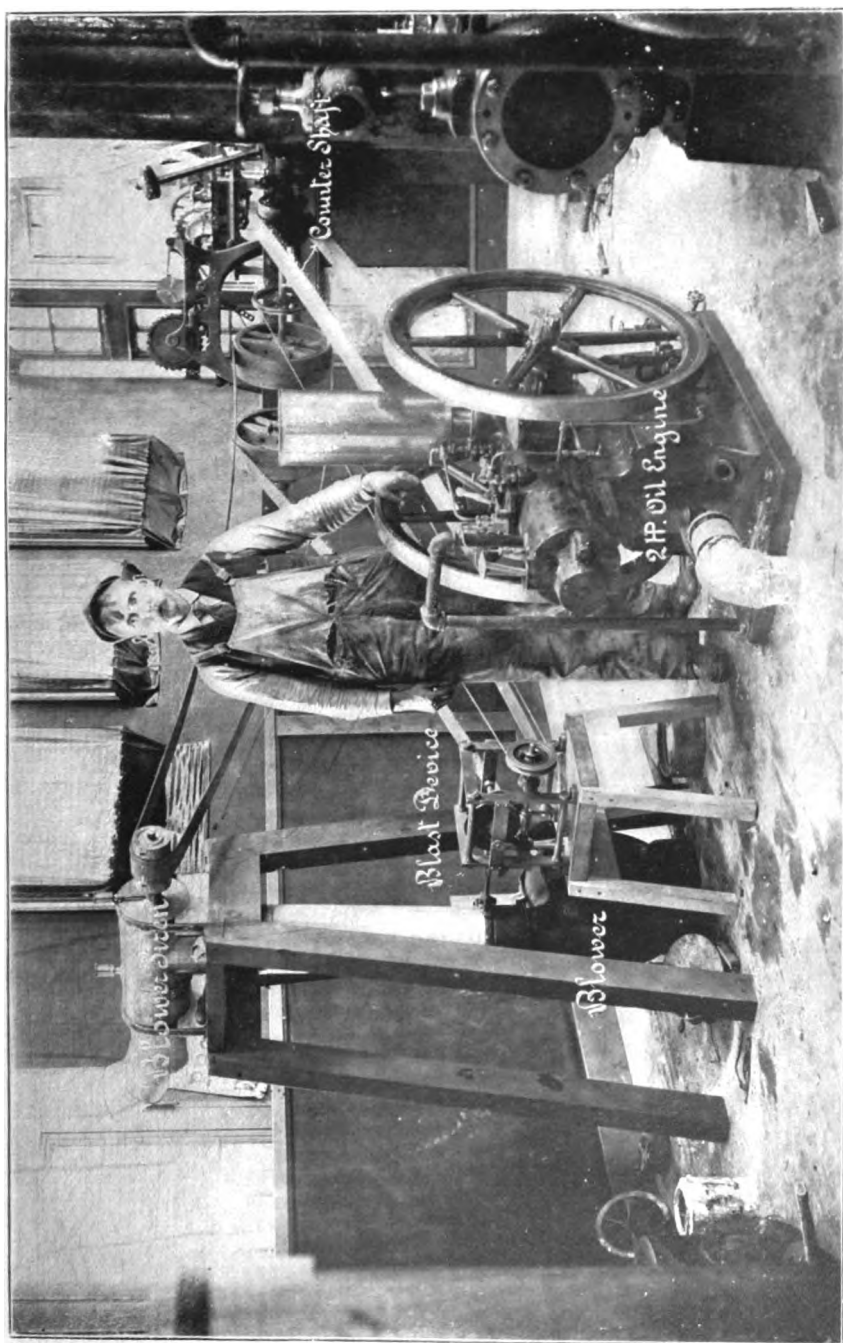
One Mietz & Weiss 2-horsepower oil-burning engine, loaned by Mr. August Mietz, to operate a blower siren, with copper horn and blast device, invented by Lieutenant-Colonel Heap.

This siren operated at a pressure of only 2 ounces per square inch, the air being supplied by a No. 2 Sturtevant blower.

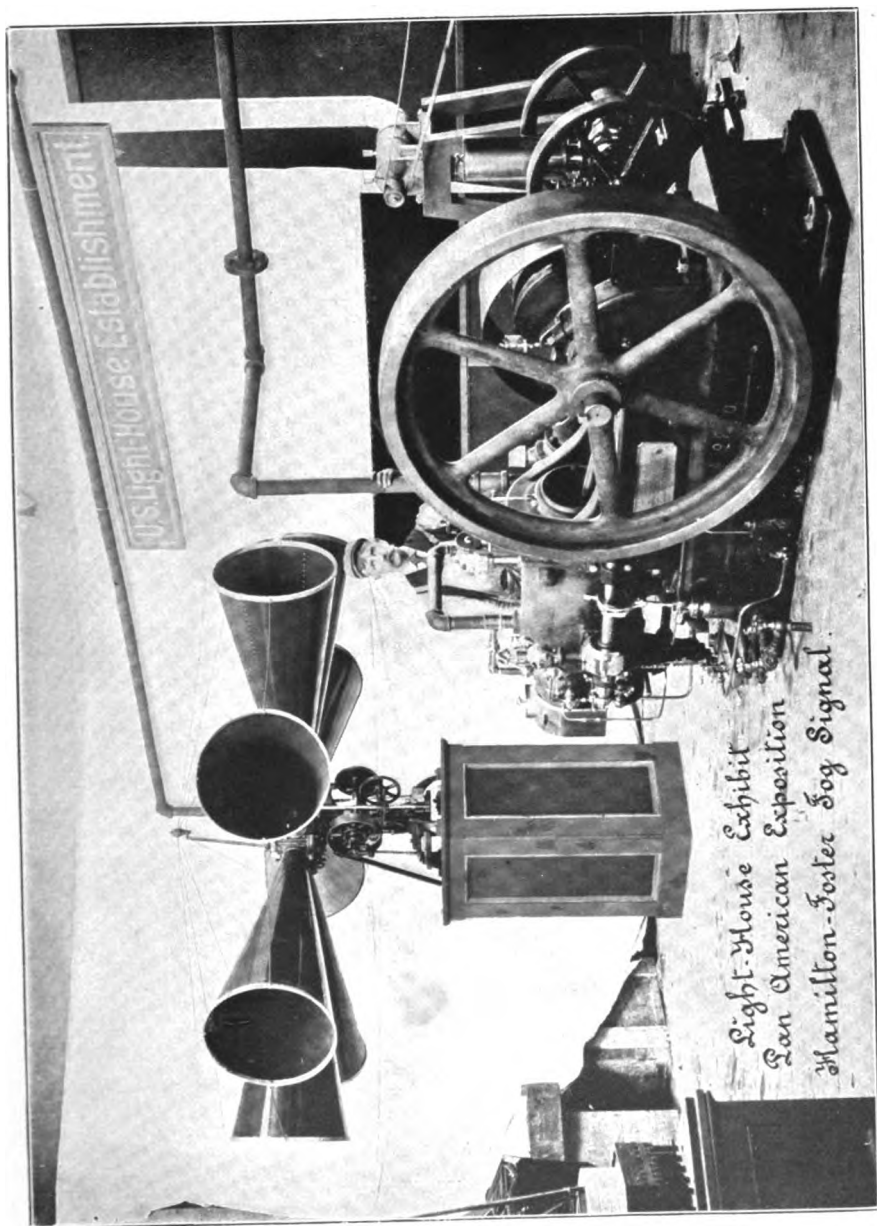
The sound can be heard ordinarily from 2 to 3 miles, and on favorable occasions has been heard over 5 miles. This siren is operated daily.

The Hamilton-Foster Fog-Signal (see photograph). Loaned by the Hamilton-Foster Fog-Signal Company, of New York, N. Y.

This signal consists of 8 megaphones pointing toward 8 points of the compass, and one siren which emits a different signal in each megaphone in turn. These signals

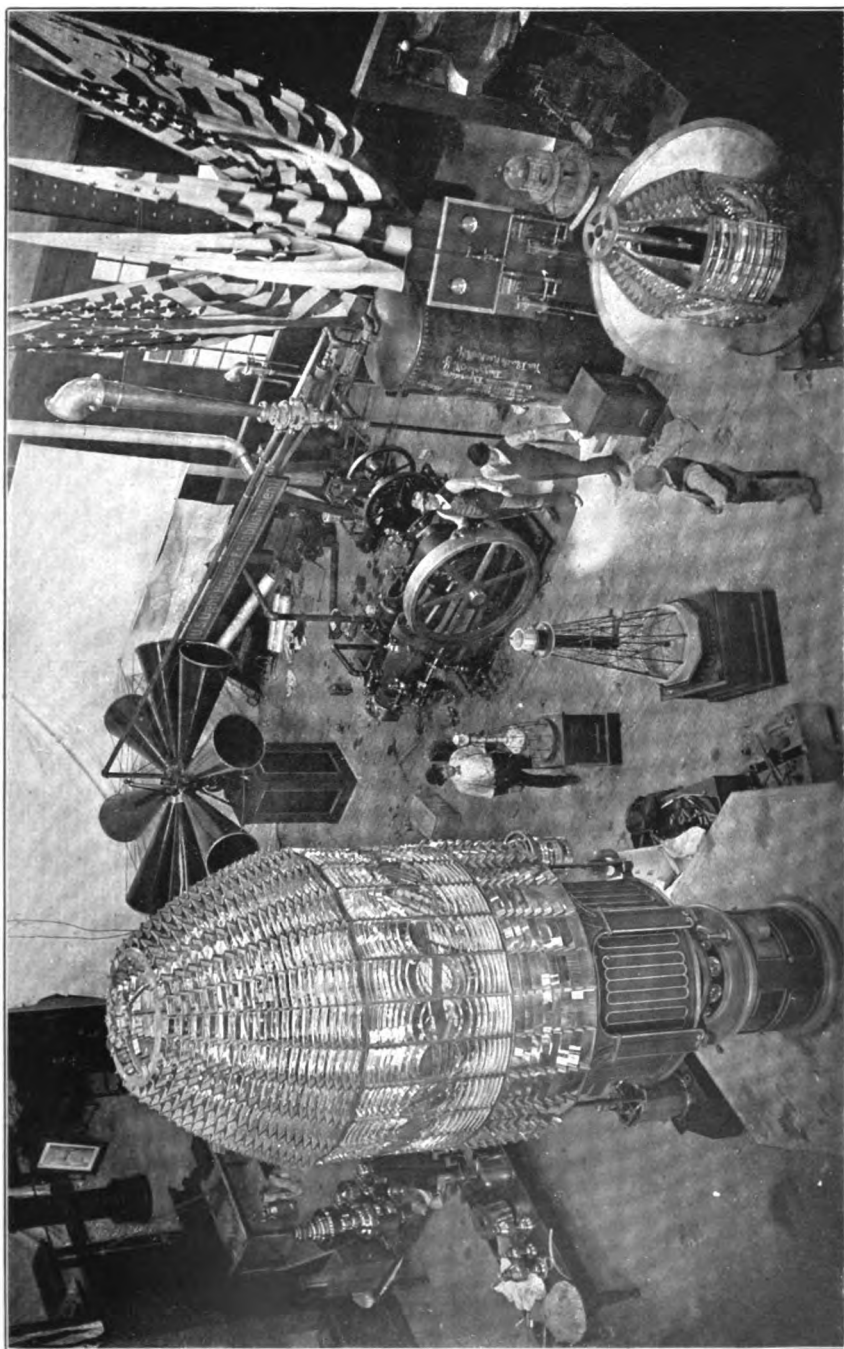


BLOWER SIREN AT THE PAN-AMERICAN EXPOSITION.





TOPOPHONE (INSTRUMENT FOR LOCATING THE DIRECTION OF SOUND).



LIGHT-HOUSE EXHIBIT AT THE PAN-AMERICAN EXPOSITION.

consist of long and short blasts. North is represented by a long blast, south by a short blast, northeast by two long blasts, southwest by two short blasts. The mariner can hear the signal through the megaphone which is pointed toward him much louder than through any other, hence, if he should hear two long blasts, he would know that the fog-signal was to the northeast; if he heard one short blast, the signal would be to the south, and so on.

One Topophone (see photograph). Loaned by Lieutenant-Colonel Heap, its inventor.

This instrument is designed to assist the ear to determine the direction of sound. It consists of two acoustic receivers, supported on a vertical shaft and connected with the ears by rubber tubes and specially-constructed ear pieces.

Method of use.—The ear pieces are placed in the ears so that the pointer is away from the observer. If the sound is heard louder on one side than the other, it comes from the loud side. The observer turns toward the loud side until the sound is heard louder in the other ear. He has then passed the direction of the sound. He now oscillates the instrument through a small angle, so that the sound is heard alternately in each ear. The pointer will now be pointed in the direction of the sound, to within one point of the compass.

MISCELLANEOUS.

A complete set of oil measures—drip pan, dustpan, service box, oil carriers, etc.—such as are supplied to new light stations.

A light-keeper's library, with books.

A photographic case containing about 90 transparencies and 65 prints of prominent and typical light-houses in various light-house districts.

The negatives were furnished by the engineers of the light-house districts, and the transparencies and prints were made by Lieutenant-Colonel Heap.

FRAMED PHOTOGRAPHS AND PAINTINGS.

Thimble Shoal, Virginia, light-station.

St. Johns, Florida, light-station.

Amelia Island, Florida, light-station.

Fort Sumter, South Carolina, light-station.

Light-house at Cleveland, Ohio.

Light-house at Galveston, Texas.

Light-house at Hunting Island, South Carolina.

Little Gull Island, Long Island Sound, New York, light-station.

Sand Key, Florida, light-station.

Pigeon Point, California, light-station.

Light-house tender *Dahlia*.

Cape Henry, Virginia, light-station.

Piedras Blancas, California, light-station.

Southwest Ledge, Long Island Sound, Connecticut, light-station.

West Bank, New York Bay, light-station.

Photographs of the Hamilton-Foster fog-signal, as set up at Falkner Island, Long Island Sound, New York, light-station.

The light-house exhibit was a part of the Treasury Department exhibit.

A full-size model of a fourth-order light-house was erected. This model is surmounted by the fourth-order cylindrical lantern, in which is the fourth-order flashing lens, lighted and in operation.

A superintendent and a light-keeper were detailed by the Light-House Board to remain at the exhibit, to keep it in proper order, and to explain the various apparatus to visitors.

The articles sent to the exposition were prepared by the engineer and inspector of the Third light-house district.

The lens apparatus, engines, sirens, etc., were set up by mechanics from the general light-house depot, and all brass work, revolving clocks, pedestals, ball bearings, lamps, etc., and the blower sirens were made at the lamp shop at the general light-house depot at Tompkinsville, N. Y.

ESTIMATES FOR GENERAL APPROPRIATIONS.

Supplies of light-houses	\$502,888.00
Repairs of light-houses	750,000.00
Salaries of light-keepers	833,000.00
Expenses of light-vessels	525,000.00
Expenses of buoyage	550,000.00
Expenses of fog-signals	190,000.00
Lighting of rivers	330,000.00
Survey of light-house sites	1,000.00
Oil houses for light-stations	20,000.00
Maintenance of lights on channels of Great Lakes	4,000.00
Porto Rican light-house service	90,000.00
Hawaiian light-house establishment	25,000.00
Light-house and fog-signal stations in Alaskan waters	126,013.00
Wireless electrical communication	25,000.00

ESTIMATES FOR SPECIAL APPROPRIATIONS.

FIRST DISTRICT.

Boon Island light-station, Maine, keeper's dwelling	\$3,400.00
Boon Island fog-signal, Maine	10,000.00
Little River Head fog-signal, Maine	12,500.00
Isles of Shoals light-station, New Hampshire, fog-signal	5,500.00
Buckle Island light and fog-signal station, Maine	14,000.00
Moose Peak light-station, Maine, keeper's double dwelling	6,000.00

SECOND DISTRICT.

Castle Island light-house depot, Massachusetts	25,000.00
Minot's Ledge light-station, Massachusetts, keepers' dwellings	5,500.00
Race Point light-station, Massachusetts, keepers' dwellings	2,800.00
State Ledge light and fog-signal station, Massachusetts	42,000.00

THIRD DISTRICT.

Black Ledge light and fog-signal station, Connecticut	60,000.00
Pecks Ledge, Norwalk Harbor, Connecticut	29,000.00
Plum Beach light-station, Rhode Island, fog signal	1,343.00
Jeffreys Hook light and fog-signal station, New York, enlarging	1,400.00
Iona Island fog-signal station, New York	1,200.00
Waackaack, New Jersey, keeper's dwelling	3,500.00
Throgs Neck, Fort Schuyler, Long Island Sound, New York	10,780.00
Staten Island light-house depot, New York	60,000.00
Tender for Light-House Service in Porto Rican waters	125,000.00

FOURTH DISTRICT.

Port Penn range, Reedy Island range, Finns Point range, Delaware River, New Jersey, reestablishment	30,000.00
Edgemoor light-house depot, Delaware, keeper's dwelling, etc.	6,000.00

FIFTH DISTRICT.

Baltimore light and fog-signal station, Maryland, additional.....	\$60,000
Ragged Point light and fog-signal station, Virginia.....	30,000
Bodie Island light-station, North Carolina, keeper's dwelling.....	7,500
Fort Washington light-station, Potomac River, Maryland, new tower..	1,600
Chester River range lights, Maryland.....	3,000
Cape Lookout light-station, North Carolina, keeper's dwelling.....	7,500
Cape Lookout Shoals light-vessel, North Carolina.....	90,000
Lazaretto Point light-house depot, Maryland, keeper's dwelling.....	2,500
Washington, D. C., rebuilding light-house wharf.....	60,000
Tender <i>Juniper</i> for the Fifth light-house district, completing.....	12,000

SIXTH DISTRICT.

Inside passage beacon lights, Georgia and Florida	4,000.00
Sapelo light-station, Georgia, tower and dwelling.....	40,000.00
Reimbursement of losses of light-keepers in Sixth district.....	2,399.13

SEVENTH DISTRICT.

Hillsboro Inlet light-station, Florida.....	90,000.00
Cape Romano, Florida, second-order light	35,000.00
Reimbursement of losses of light-keeper in Seventh light-house district.	124.75
Reimbursement of losses of assistant light-keeper in Seventh light-house district	75.00

EIGHTH DISTRICT.

Sabine Pass jetty light and fog-signal station, Louisiana and Texas.....	40,000.00
Heald Bank light-vessel, Texas	90,000.00
Cubits Gap fog-signal station, Louisiana, keeper's dwelling.....	2,500.00
Oyster Bayou light-station, Louisiana.....	5,000.00
Tender for Mobile ship channel	40,000.00
Reimbursement of losses of light-keepers in the Eighth light-house district	2,603.62

NINTH DISTRICT.

Milwaukee Breakwater and Harbor of Refuge, Wisconsin, light and fog-signal	75,000.00
Fishermans Shoal light and fog-signal station, Wisconsin	75,000.00
Pointe aux Barques light and fog-signal station, Michigan.....	32,000.00
Portage Lake light-station, Michigan, keeper's dwelling	3,500.00
Kewaunee light and fog-signal station, Wisconsin, keeper's double dwelling.....	7,500.00
Calumet Pierhead light-station, Illinois, keeper's dwelling	Authority.
Holland Pierhead Range, Michigan, fog-signal	6,000.00
St. Martin Island light and fog-signal station, Michigan, additional	14,000.00
Little Gull Island light and fog-signal station, Michigan.....	20,000.00
Peshtigo Reef light-vessel, Green Bay, Wisconsin	15,000.00
Tender for inspector Ninth light-house district, completing	30,000.00
Tender <i>Hyacinth</i> for the engineer Ninth light-house district, completing.	65,000.00
Depot for the Ninth light-house district.....	50,000.00

TENTH DISTRICT.

Tibbetts Point, St. Lawrence River, New York, keeper's dwelling.....	3,500.00
Fort Niagara, N. Y., small light at mouth of river	2,000.00
Strawberry Island cut and channel, Niagara River, New York, range lights.....	13,000.00
Toledo Harbor light and fog-signal station, Ohio, completing.....	10,000.00
Grassy Island Range (Ecorse) light-station, Michigan, keeper's dwelling.....	5,000.00
Groese Isle South Channel Range light-station, Michigan, keeper's dwelling.....	5,000.00
Groese Isle North Channel Range light-station, Michigan, keeper's dwelling.....	3,500.00

ELEVENTH DISTRICT.

Middle Island light and fog-signal station, Michigan	\$25,000.00
Crisps Point light and fog-signal station, Michigan	18,000.00
Rock of Ages light and fog-signal station, Michigan	125,000.00
Eagle River light-station, Michigan, moving to Sand Hills	25,000.00
Isle aux Peches Range, Michigan, additional lights	12,000.00
Tawas light-station, Michigan, keeper's dwelling	5,000.00
Martins Reef light-vessel, Lake Huron	35,000.00
Spectacle Reef, Michigan, Lake Huron, repairing	54,100.00
Relief light-vessel for Ninth and Eleventh districts	30,000.00
Tender for St. Marys River, Michigan	75,000.00

TWELFTH DISTRICT.

Point Buchon light and fog-signal station, California	40,000.00
Santa Barbara light-station, California, keeper's dwelling and tower ...	7,500.00
Point Sur light-station, California, keeper's dwelling	6,000.00
Pigeon Point light-station, California, site	5,000.00
Southampton Shoal light and fog-signal, California	30,000.00
Karquines Strait light and fog-signal, California	50,000.00
Quarry Point fog-signal station, California	12,000.00
Fort Winfield Scott fog-signal, California	7,000.00
Cape Mendocino light-station, California, keeper's dwelling	5,500.00
Humboldt Bay, California, fog-signal	15,000.00
Yerba Buena Island, California, oil house	8,000.00
Bonita Point, California, keeper's double dwelling	11,905.00
Blunts Reef light-vessel, Pacific Ocean, off Cape Mendocino, California ..	90,000.00
Tender for the engineer Twelfth light-house district	125,000.00

THIRTEENTH DISTRICT.

Battery Point light and fog-signal station, Puget Sound, Washington, fog bell with suitable dwelling, including site	6,000.00
New Dungeness light-station, Washington, keeper's dwelling	4,500.00
Cape Blanco light-station, Oregon, keeper's dwelling	4,500.00
Robinson Point light-station, Washington, keeper's dwelling	4,000.00
Burrows Island light and fog-signal station, Washington	15,000.00
Semiahmoo light and fog-signal station, Washington	25,000.00
Yaquina Head light-station, Oregon, keeper's dwelling	4,000.00

FIRST DISTRICT.

This district extends from the head of navigation on the St. Croix river, Maine, the northeastern boundary of the United States, to and includes Hampton Harbor, New Hampshire. It embraces all aids to navigation on the seacoast of Maine and New Hampshire and on all waters between the limits named.

Inspector.—Commander James K. Cogswell, United States Navy, to March 1, 1901; Commander N. J. K. Patch, United States Navy, to June 1, 1901; Commander Arthur P. Nazro, United States Navy, from June 1, 1901.

Engineer.—Lieut. Col. William S. Stanton, Corps of Engineers, United States Army.

In this district there are—

Light-houses and beacon lights.....	77
or unlighted beacons.....	114
Signals operated by steam, caloric, or oil engines.....	13
Signals operated by clockwork.....	28
Lighting buoys in position.....	15
Buoys in position.....	21
or buoys in position.....	701
Steamer <i>Lilac</i> , buoy tender, and for supply and inspection.....	1
Steamer <i>Myrtle</i> , for construction and repair in the First and Second districts....	1
Steamer <i>Geranium</i> , buoy tender, and for supply and inspection.....	1

RE.—The number preceding the name of a light-station in the First, Second, Third, Fourth, Fifth, Sixth, Seventh, and Eighth districts is that by which it is designated in the List of Lights and Fog-Signals on the Atlantic and Gulf coasts of the United States, corrected to June 30, 1901.

LIGHT STATIONS.

Little River Head, mouth of Little River Harbor, Maine.—The following recommendation was made in the Board's annual reports from 1889 to 1894, and from 1896 to 1899:

It is the entrance to Cutler Harbor, which is a station of the Eastport, St. John, and Bay of Fundy pilots. Vessels entering the Bay of Fundy first make for the Islands and then try to make Little River light. It is a harbor of refuge, and is used as such by vessels when they can get in. This, however, is impossible in bad weather without a more effective fog-signal than the bell now on Little River light. The steamer *Eduardo* was wrecked on Old Man Island in 1889, 2 miles from Cutler Harbor, and proved a total loss. The crew, numbering 40 in all, was saved. She cost \$285,000, and her master stated formally that he was of opinion that the accident would not have occurred had there been a proper fog-signal at that point.

The Board recommended the establishment of a fog-signal there in six annual installments. It is estimated that the establishment of such a signal would cost \$10,500, and an appropriation of that amount is therefore recommended.

This estimate, which was made twelve years ago, is no longer correct, on account of the increase in the cost of labor and material. It is now estimated that it will cost \$12,500 to establish this fog-signal, and the Board recommends that an appropriation of this amount be asked for.

6. *Avery Rock, in Machias Bay, Maine.*—The dwelling was repaired and improved, the boathouse was moved and enlarged, a footbridge was built to it across the chasm, and a new boat slip was built.

7. *Libby Islands, entrance to Machias Bay, Maine.*—The old brick chimney was torn down and replaced by a larger and taller one to increase the draft of the fog-signal boilers, and the fog-signal machinery was overhauled and repaired.

8. *Moose Peak, on Mistake Island, seacoast of Maine.*—The walls of the tower were reinforced by an 8-inch covering of brick masonry, a boat slip was built, 55 feet of cellar drain was laid, the covered way was extended 103 feet to the dwelling, and the revolving clock was overhauled and repaired.

The following recommendation, made in the Board's last two annual reports, is renewed:

The dwelling occupied by the keeper and assistant keeper is old, in very poor condition, and is past economical repair. The Board proposes to replace it with a new double dwelling. It is estimated that this can be done for not exceeding \$6,000, and the Board recommends that an appropriation of this amount be made therefor.

10. *Nash Island, on Nash Island, Pleasant Bay, Maine.*—The old Stevens striking machine was replaced by one built in the light-house machine shop in Boston. Various repairs were made to the keeper's dwelling.

11. *Narraguagus, entrance to Narraguagus Bay, Maine.*—The deeds conveying to the United States title to land for a boat slip were obtained and are being examined.

12. *Petit Manan, on Petit Manan Island, Maine.*—The old brick chimney was torn down and replaced by a larger and taller one to increase the draft of the fog-signal boilers; a new duplex pump was installed; the lower 40 feet of the boat slip was rebuilt, and the fog-signal machinery and revolving clock were overhauled and repaired.

15. *Mount Desert, on Mount Desert Rock, Atlantic Ocean, about 20 miles to southeast of Mount Desert Island, Maine.*—A brick oil house was built, and the fog-signal machinery was overhauled and repaired.

16. *Egg Rock, Frenchman Bay, Maine.*—The interior of the dwelling was improved, a cellar built under it, and the old striking machine replaced by one rebuilt in the light-house machine shop in Boston.

19. *Great Duck Island, seacoast of Maine.*—A stone oil house was built, the west boat slip was extended 30 feet and 50 cubic yards of rock were blasted at its northwest side. A branch boat slip 60 feet long was built and a channel blasted out at its end. The west boat-house was moved to a more secure site and new piers were built under it. The old brick chimney was replaced by a larger and taller one to increase the draft of the fog-signal boilers. The keepers' dwellings were connected by telephone with the fog-signal house, and the fog-signal machinery and the revolving clock were overhauled and repaired.

21. *Bass Harbor Head, entrance to Bass Harbor, Maine.*—A Stevens striking machine was installed in place of the Shipman oil engines; a weight shaft and 100 feet of wire fence along the crest of the bluff were built, and 45 feet of tile drain was laid.

23. *Blue Hill Bay, on Green Island, Maine.*—A fog bell struck by machinery was established September 15, 1900, the entrance through the iron deck to the lantern was enlarged, an extra rail was put around the lantern, and the chimney of the dwelling was repaired.

24. *Saddleback Ledge, near Isle au Haut, Maine.*—Some 40 feet of the boat slip was rebuilt and various repairs were made.

— *Buckle Island, entrance to York Narrows, Maine.*—The following recommendation, made in the last four and several previous annual reports of the Board, is renewed:

The Board is informed that something more than 1,000 sailing vessels, carrying lumber, fish, hay, coal, granite, and general merchandise, annually use this passage. There are also several lines of steamboats, some of which make two trips a day, carrying large numbers of passengers to and from Bar Harbor and other points along the shore, which would be benefited by lights on Buckle Island. In the early spring and late fall steamers, and especially sailing vessels, find it necessary to go through the passage during the night, when a light on Buckle Island would be of great assistance to them. It is further stated that several vessels have been cast away on Buckle Island, among them the schooner *Waller Scott*, which was wrecked in the winter of 1870. It is proposed, if the necessary appropriation is made, to place a white light with four red sectors, with a post range light 100 feet in front of the main light. It is estimated that these range lights can be established at a cost not exceeding \$14,000, and it is recommended that an appropriation of this amount be made therefor.

30, 31. *Matinicus Rock, on Matinicus Rock, off the southern entrance to Penobscot Bay, seacoast of Maine.*—The stone wall under the L of the assistants' dwelling was rebuilt and the dwelling was repaired. A ledge of rock at the landing was blasted out. A hoisting engine was installed at the head of the boat slip, the fog-signal boiler was retubed and tested, and the fog-signal machinery was overhauled and repaired.

33. *Whitehead, on Whitehead Island, entrance to Penobscot Bay, Maine.*—The old brick chimney was replaced by a larger and taller one to increase the draft of the fog-signal boilers, the fog-signal machinery was overhauled and repaired, and the tower deck was pointed.

35. *Rockland Breakwater, entrance to Rockland Harbor, Maine.*—The act approved June 6, 1900, appropriated \$30,000 for the establishment of a light and fog-signal station on the breakwater. A contract for its erection was entered into June 11, and approved June 20, 1901. In August, 1900, the temporary lights were exhibited from a new temporary structure near the finished end of the breakwater, and in June, 1901, the structure was moved to the extreme end of the breakwater to clear the site for the new station.

38. *Negro Island, entrance to Camden Harbor, Maine.*—A brick cistern was built in the dwelling.

42. *Tennant Harbor, on the east side of Southern Island, entrance to Tennant Harbor, Maine.*—The entrance to the lantern, through the iron deck, was enlarged, a fence was built along the front of the reservation, the revolving clock was overhauled and cleaned, and minor repairs were made to the dwelling.

45. *Manana Island fog-signal station, on Manana Island, Maine.*—A Shipman engine, formerly used to operate a fog bell, was installed for hauling supplies by trolley.

46. *Franklin Island, Muscongus Bay, entrance to St. George River, Maine.*—The entrance to the lantern, through the iron deck, was enlarged, and the revolving clock was overhauled and cleaned.

48. *Ram Island, entrance to Boothbay, Maine.*—The tower lightning rod was repaired, the striking machine was overhauled and adjusted, and the iron piers of the bridge leading to the tower were scaled and painted.

49. *Burnt Island, entrance to Boothbay Harbor, Maine.*—A lightning rod was put on the oil house and the striking machine was overhauled and adjusted.

50. *Cuckolds fog-signal station, off entrance to Boothbay, Maine.*—The concrete apron along the underpinning of all the buildings was repointed and the concrete floor of the balcony was renewed. The fog-signal machinery was overhauled and repaired, and repairs were made to the dory slip and boat slip.

51. *Hendricks Head, mouth of Sheepscot River, Maine.*—The lower end of the boat slip was extended 20 feet, the whole slip was slightly widened, a walk was built on its south side, and various repairs were made.

54. *Perkins Island, Kennebec River, Maine.*—The \$1,620 appropriated June 6, 1900, was applied in part to building a boathouse and boat slip. The barn was moved nearer the dwelling. A drain pipe was laid for conducting surface water from the cellar, and various repairs were made.

55. *Squirrel Point, Arrowsic Island, Kennebec River, Maine.*—The \$1,620 appropriated June 6, 1900, was applied in part to building a boathouse and boat slip. The barn and fuel house were moved nearer the dwelling, and a boundary fence was built.

56, 57. *Doubling Point Range at lower end of Fiddlers Reach, Kennebec River, Maine.*—The \$1,620 appropriated June 6, 1900, was applied in part to building a boathouse and boat slip. The fuel house was moved nearer the dwelling, and about 600 feet of post and wire boundary fence and 130 feet of plank walk were built.

58. *Doubling Point, Kennebec River, Maine.*—The \$1,620 appropriated June 6, 1900, was applied in part to building a boathouse and boat slip. The dwelling was moved nearer the tower, and a new cellar and underpinning were made under it, completing the moving of the entire station which was begun with the moving of the tower in 1899. The old bell tower was moved and made into a fuel house, about 940 feet of post and wire boundary fence and a cistern were built, and the ground and walks around the dwelling were graded.

62. *Seguin, off the mouth of the Kennebec River, seacoast of Maine.*—The entrance through the iron and stone decks to the lantern tower was enlarged. An engine formerly used in making the characteristic of the station was repaired and installed for hauling coal. The fog-signal machinery was overhauled and repaired and the stone wall around the reservoir was built 2 feet higher to increase its capacity. Various repairs were made to the dwelling.

65, 66. *Cape Elizabeth, on Cape Elizabeth, Maine.*—The west keeper's dwelling was enlarged and rearranged to provide two separate sets of quarters for the first and third assistants. The second assistant's dwelling was repaired and improved. The covered way to the west tower was rebuilt; the old covered way was moved and converted into a fuel house; the second-class siren was replaced by a 12-inch whistle; a 10-inch whistle was installed on the right-hand boiler; the fog-signal machinery was overhauled and repaired, and the engines operating the characteristic valves were replaced by automatic clocks.

68. *Spring Point Ledge, Portland Harbor, Maine.*—The characteristic of the light was changed September 1, 1900. Various repairs were made.

73. *Boon Island, seacoast of Maine.*—The following recommendation, made in the Board's last ten annual reports, is renewed:

There are at this station one keeper and two assistants, and but two sets of quarters in one double dwelling. The second assistant keeper has to board either with

the family of the keeper or with that of the first assistant keeper. This forced arrangement is unsatisfactory to all, and is quite unfavorable to the retention of a second assistant of the needed qualifications. The station is isolated and exposed, the tower is tall, and this second-order light is an important one.

A third dwelling, which is urgently needed, it is estimated can be built for \$3,400. It is therefore recommended that an appropriation of this amount be made therefor.

Rear-Admiral (then Capt.) R. D. Evans, U. S. N., member of the Light-House Board, stated at the session of the Board held on October 4, 1897, that on his summer cruise he arrived off Boon Island, Maine, light-house in a fog and failed to hear the fog-signal—a bell struck by hand—under circumstances when a failure to hear it might have been extremely dangerous. The Board thereupon made investigation of the needs of commerce and navigation, and arriving at the conclusion that while a more efficient fog-signal was needed in that vicinity it would be most useful at White Island, one of the Isles of Shoals, it so recommended in its annual report for 1897, and repeated it in each annual report since, that an appropriation of \$5,500 be made for that purpose. The Board has now become convinced from recent developments that the most desirable point in the region of the Isles of Shoals for a fog-signal is Boon Island. The steamers plying between Boston and Bangor run from Seguin light, at the mouth of the Kennebec River, for Boon Island, and the steamers from Portland and from St. Johns to Boston all run for Boon Island in the winter, and they are all afraid of Pollocks Rock, nearly a mile southwesterly from Boon Island. The Board therefore now recommends that an effective fog-signal be established at Boon Island in addition to the bell fog-signal now there, which bell will be of use in case of the disability at any time of the proposed new fog-signal. It is estimated that such a fog-signal can be established at Boon Island for a sum not to exceed \$10,000, and the Board recommends that an appropriation of that amount be made therefor.

74. *Whaleback, entrance to Portsmouth Harbor, New Hampshire.*—A stone apron dogged with heavy irons was laid around the base of the tower and bulkhead on the southerly side, a boat slip and a pier for a landing and for the protection of the boat slip were built, four large air tanks were put in place to increase the air-storage capacity, and the fog-signal machinery was overhauled and cleaned. Work is in progress on improved fog-signal machinery to replace that now in use.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

2. St. Croix River, Me.
3. Lubec Channel, Me.
4. West Quoddy Head, Me.
5. Little River, Me.
14. Winter Harbor, Me.
17. Crabtree Ledge, Me.
18. Baker Island, Me.
20. Bear Island, Me.
25. Deer Island Thorofare, Me.
26. Goose Rocks, Me.
29. Heron Neck, Me.
32. Two Bush Island, Me.
34. Owls Head, Me.

36. Browns Head, Me.
37. Indian Island, Me.
39. Grindell Point, Me.
43. Marshall Point, Me.
44. Mohegan Island, Me.
64. Halfway Rock, Me.
67. Portland Head, Me.
69. Portland Breakwater, Me.
70. Wood Island, Me.
73. Boon Island, Me.
75. Portsmouth Harbor, Me.
80. Isles of Shoals, N. H.

LIGHT-VESSELS.

63. *Cape Elizabeth light-vessel, No. 74, Maine.*—The following statement was made in the Board's last annual report:

An appropriation of \$70,000 was made by the act approved on March 3, 1899, for constructing a light-vessel with a fog-signal, to be placed near Cape Elizabeth, Maine. That amount being found insufficient for the purpose, an appropriation of \$20,000 was made by the act approved June 6, 1900, in addition to the former appropriation. She is being built under a contract which requires that she be finished by May 15, 1901.

The contractors have received but two of the eight equal partial payments to which they will be entitled when the vessel is finished. They have been repeatedly admonished. But for the fact that no time would be gained by so doing, the contract would be annulled and given to another contractor. The vessel is about 60 per cent finished.

DAY OR UNLIGHTED BEACONS.

Fiddler Ledge, Penobscot Bay, Maine.—Three stones in the base section were put in place and the beacon was repointed.

Cox Ledge Spindle, Harpswell Harbor, Maine.—A red iron spindle surmounted by a red cask was established July 26, 1900.

York Ledge, off Cape Neddick, Maine.—The iron spindle was righted and secured in place, and a 20-foot forged iron topmast, with cage, was added.

FOG SIGNALS OPERATED BY STEAM, CALORIC, OR OIL ENGINES.

4. *West Quoddy Head, Maine.*—The 10-inch steam whistle, in duplicate, was in operation some 1,232 hours during the year, and consumed about 81 tons of coal.

7. *Libby Islands, Maine.*—This 10-inch steam whistle, in duplicate, was in operation some 1,389 hours during the year, and consumed about 78 tons of coal.

12. *Petit Manan, Maine.*—This 10-inch steam whistle, in duplicate, was in operation some 2,064 hours during the year, and consumed about 79 tons of coal.

15. *Mount Desert, Maine.*—This third-class Daboll trumpet, in duplicate, was in operation some 1,161 hours during the year, and consumed about 356 gallons of oil.

19. *Great Duck Island, Maine.*—This 10-inch steam whistle, in duplicate, was in operation some 1,329 hours during the year, and consumed about 63 tons of coal.

30, 31. *Matinicus Rock, Maine.*—These signals are a 10-inch and a 12-inch steam whistle. The 10-inch whistle was in operation some 260 hours during the year, and consumed about 12 tons of coal. The 12-inch whistle was in operation some 1,162 hours during the year, and consumed about 69 tons of coal.

33. *Whithead, Maine.*—This 10-inch steam whistle, in duplicate, was in operation some 1,311 hours during the year, and consumed about 66 tons of coal.

45. *Manana Island, Maine.*—This first-class Daboll trumpet, in duplicate, was in operation some 1,092 hours during the year, and consumed about 595 gallons of oil.

50. *Cuckolds, Maine*.—This Daboll trumpet, in duplicate, was in operation some 1,003 hours during the year, and consumed about 6 tons of coal.

52. *Sequin, Maine*.—This 10-inch steam whistle, in duplicate, was in operation some 1,010 hours during the year, and consumed about 74 tons of coal.

65, 66. *Cape Elizabeth, Maine*.—These signals are a second-class steam siren and a 12-inch steam whistle. The second-class siren was in operation some 359 hours during the year, and consumed about 18 tons of coal. The 12-inch whistle was in operation some 509 hours during the year, and consumed about 23 tons of coal. On June 5, 1901, a 10-inch steam whistle was substituted for the second-class siren, but was not in operation up to June 30, 1901.

67. *Portland Head, Maine*.—This second-class Daboll trumpet, in duplicate, was in operation some 785 hours during the year, and consumed about 424 gallons of oil.

74. *Whaleback, New Hampshire*.—This third-class Daboll trumpet, in duplicate, was in operation some 708 hours during the year, and consumed about 160 gallons of oil.

BUOYAGE.

During the year there were established 1 whistling, 1 bell, and 11 spar buoys, and 1 day or unlighted beacon. There are 15 whistling buoys and 21 bell buoys, all in good condition.

LIGHT-HOUSE DEPOTS.

Bear Island, Mount Desert Island, Maine.—No repairs were made.

Whitehead, West Penobscot Bay, Maine.—No repairs were made.

Little Diamond Island, Portland Harbor, Maine.—No repairs were made.

LIGHT-HOUSE TENDERS.

Lilac.—This steel screw steamer was built in 1892, and has a displacement of 550 tons. She was employed throughout the year. She was hauled out in July, 1900, and in January and June, 1901, when her bottom was cleaned and painted and minor repairs were made to her stern bearing, keel, and shoe. During the year she was hauled off 16 days for repairs to her engines and for the installation of a new feed pump, a steam steerer, etc., exclusive of 8 days on the ways for cleaning and painting. She was employed 4 days going to Boston, Mass., taking on board machinery and conveying it to Whaleback light-station. She was laid up for repairs 24 days. She was at the Bath, Me., Iron Works from July 1 to July 26, 1900, inclusive, receiving a new boiler and fittings and for modifications of joiner work, repairs to her inner bottoms, and an ash ejector. She steamed 9,545 miles and consumed 935 tons of coal. She established 5 buoys, replaced 31 buoys, changed 87 buoys, painted 233 buoys, landed 128 tons of coal at the different light and fog-signal stations, and did some 45 days' work on buoys at the light-house depot.

Geranium.—This wooden side-wheel steamer was built in 1863, and is of about 356 tons burden. She did good service in delivering coal

and supplies, and in painting, changing, replacing, and establishing buoys. She was hauled out in October, 1900, when her bottom was cleaned and painted and repairs were made to her hull. During the year she was hauled off 29 days for scaling her boiler and for repairs to her boiler and engine, exclusive of 1 day on the railway for repairs to her hull. She was laid up 30 days. She steamed about 5,944 miles and consumed some 570 tons of coal. She established 8 buoys, replaced 25 buoys, changed 134 buoys, painted 114 buoys, landed 144 tons of coal at the different light and fog-signal stations, and did 85 days' work on buoys at the depot.

Myrtle.—This steamer, being used for construction and repair work in both the First and Second light-house districts, will be described in the report of work done in the Second light-house district.

SECOND DISTRICT.

This district extends from Hampton Harbor, New Hampshire, to Fisha Ledge, off Warren Point, Rhode Island, but does not include either the harbor or the ledge. It embraces all aids to navigation on the seacoast and tidal waters of Massachusetts, excepting on the Muncie River and that part of Mount Hope Bay lying within the State boundary.

Inspector.—Capt. Washburn Maynard, United States Navy, to October 1, 1900. Commander Arthur P. Nazro, United States Navy, from October 1, 1900.

Engineer.—Lieut. Col. William S. Stanton, Corps of Engineers, United States Army.

In this district there are—

Light-houses and lighted beacons.....	81
Light-vessels in position	10
Light-vessels for relief	2
Day or unlighted beacons	72
Day-signals operated by steam, caloric, or oil engines	12
Day-signals operated by clockwork	11
Lighted buoys in position	8
Whistling buoys in position	12
All buoys in position	20
Electric-bell buoy in position	1
Other buoys in position	554
Boat buoys for winter use	11
Cameras <i>Verbena</i> , <i>Mayflower</i> , and <i>Azalea</i> , buoy tenders and for supply and inspection	3
Camera <i>Myrtle</i> , for construction and repair in the First and Second districts....	1

LIGHT-STATIONS.

84-85. *Newburyport Upper Harbor, Newburyport, Mass.*—The height of the outer light was increased 11 feet and of the inner light 9 feet. A barbed wire addition was built along the top of the board fence enclosing part of the reservation.

88. *Annisquam Harbor, east side of entrance to the harbor, Massachusetts.*—Extensive repairs and improvements were made to the dwelling, including its entire interior rearrangement. Some 375 feet of post and wire fence, a wire fence along 3,000 feet of the boundary line, and a stone retaining wall along the beach for a roadway, were built.

92. *Eastern Point, entrance to Gloucester Harbor, Massachusetts.*—Boathouse and boat slip were built from the \$500 appropriated June 1900, for that purpose. The engine house was enlarged and the horsepower engine for striking the bell was replaced by a 2-horsepower engine.

96, 97. *Baker Island, entrance to Salem Harbor, Massachusetts.*—A line of posts and trussed wire was built along about 1,100 feet of the boundary. A new fog-bell striker was installed. By a conveyance of land both to and from the United States the boundary line was adjusted

to the line occupied for many years by the inclosure fence. Various repairs were made.

98. *Hospital Point, Beverly, north side of Salem Harbor entrance, Massachusetts.*—The station was connected with the water supply of the city of Beverly. Repairs were made to the dwelling.

101. *Marblehead, southeast side of entrance to Marblehead Harbor, Massachusetts.*—A boathouse, boat slip, 70 feet of close board fence, 60 feet of rail board fence, and two gates at the entrance to the reservation, were built. Minor repairs were made.

109. *Minots Ledge, entrance to Boston Bay, Massachusetts.*—The work of repairing, improving, and enlarging one of the old dwellings to fit it for a keeper and one assistant, commenced in May, was nearly completed at the close of the fiscal year. Various repairs were made.

The following recommendation, made in the Board's last annual report, is renewed:

The keeper and one assistant, with their families, occupy an old dwelling, converted, about forty years ago, to that use from a barn. It is adapted to the use of but one family, and affords the two families neither the necessary room, privacy, nor conveniences. The double dwelling occupied by the other two assistants with their families is ill arranged. The main part for each family contains but two rooms below and a large, cold, and useless hall. It is necessary to do away with the hall and with the kitchen, which is under a shed roof, and to provide three comfortable rooms on each floor in the main part for each family. While the station is an important one, the dwellings are very inferior, and little has been expended upon them for many years. It is estimated that the rearrangement and renovation of the dwellings can be made for not exceeding \$5,500, viz, \$2,500 for the dwelling for the keeper and one assistant, \$3,000 for the dwelling of the two assistants. The Board therefore recommends that \$5,500 be appropriated therefor.

— *State Ledge, Boston Harbor, Massachusetts.*—The following recommendation, which has been made in the last eleven annual reports of the Board, is renewed:

The ship channel, from the Boston wharves to Nix Mate buoy, has no aids to navigation except buoys. Vessels find it very difficult in thick weather and at night to keep in the channel, and they are particularly perplexed to know just where to turn in the neighborhood of State Ledge and buoy No. 8, both in leaving and entering the harbor. Large excursion steamers, as well as steamers of the regular lines running out of Boston, frequently have to anchor in thick weather solely because they have no guide between Nix Mate buoy and the wharves. This greatly incommodes business men going and coming during the summer months when fogs are prevalent. The Board has recognized for a long time the necessity for a light and fog-signal at this point, but has postponed action while the improvements in the channel of the harbor in charge of the United States engineers were in progress. The Board is of opinion that the time has arrived when a light and fog-signal ought to be established near buoy No. 8, or at or near State Ledge. It is estimated that it will cost \$42,000 to establish a light and fog-signal at this point.

It is recommended that an appropriation of this amount be made therefor.

118. *Long Island Head, Boston Harbor, Massachusetts.*—With the appropriation of \$4,500 made by the act of June 6, 1900, the station was moved to a new site, by building a new brick tower where it is not exposed to injury by the firing of guns in the new seacoast battery, and by moving the dwelling, outbuildings, and oil house to the vicinity of the new tower. The old iron tower was sold at auction. The light was exhibited from the new tower on November 1, 1900. A covered way was built from the dwelling to the tower. The station was connected with the Boston city water supply. Various repairs were made.

129. *Race Point, northwesterly point of Cape Cod, Massachusetts.*—The old brick chimney was torn down and replaced by a larger one to increase the draft of the fog-signal boilers, and the fog-signal machinery was overhauled and put in order. Materials for repairing, enlarging, and rearranging the dwelling of the two assistants and to convert it from a single into a double dwelling were sent to the station. A cellar was made and the frame of the enlargement erected and sheathed.

The following recommendation, made in the Board's last two annual reports, is renewed.

The assistants' dwelling has only one outer door, besides which the lower hall, stairs, and upper hall have to be used in common by both families. One family has only a kitchen on the lower floor and the other its kitchen and dining room, there being but three rooms on this floor. All other rooms used by both families are reached in common by one flight of stairs. The two families are deprived of privacy and are compelled to intermingle more or less, which causes dissatisfaction and discontent and is unfavorable to retaining assistants of the grade which the light and the first-class fog signal at Race Point require. The keeper's dwelling has only two rooms on each floor, and he much needs and should have another room on each floor. It is estimated that the dwelling occupied by the two assistant keepers can be remodeled at a cost not exceeding \$1,900, and that the keeper's dwelling can be remodeled at a cost not exceeding \$900. The Board therefore recommends that an appropriation of \$2,800 be made for remodeling the two dwellings as proposed.

135. *Cape Cod, on the highlands, seaward side of Cape Cod, Massachusetts.*—The act of June 6, 1900, appropriated \$15,000 for changing the characteristic of the first order light from a fixed white to a flashing white. On March 13, 1901, after correspondence with French and English manufacturers, an optical apparatus was ordered. It has four panels of 0.92 meter focal distance, revolves on a float in mercury, and will give, every 5 seconds, flashes of about 192,000 candlepower nearly one-half second in duration. It will soon be received and installed. Materials for building a temporary tower for use during the installation of the new optical apparatus were sent to the station. The work of repairing, rearranging, and improving the first and second assistants' dwellings, commenced in June, was almost completed at the close of the fiscal year. The fog-signal machinery was put in order.

153. *Brant Point, west side of the entrance to Nantucket Harbor, Massachusetts.*—A new tower was built at the extremity of the point, and on January 31, 1901, the light was exhibited from it. Five lots of land, embracing 5.9 acres, no longer required for light-house purposes, were sold and the net proceeds paid into the Treasury.

156, 157. *Nantucket East and West Breakwater, entrance to Nantucket Harbor, Massachusetts.*—The charge of these lights was transferred on April 20, 1901, to the Light-House Establishment from the works of harbor improvement. For the use of the keeper who tends them, a boat slip 148 feet long, was built at Brant Point light station.

171. *Noboka Point, entrance to Woods Hole Harbor, Massachusetts.*—A brick oil house was built and the striking machine of the fog signal was overhauled and adjusted.

179. *Dumpling Rock, off New Bedford Harbor, Massachusetts.*—The engine house was enlarged, a brick oil house was built, the two 2-horsepower steam oil engines were replaced by two 4-horsepower Hornsby-Akroyd oil engines. Minor repairs were made to the boat slip.

181. *Palmer Island, west side of entrance to New Bedford Inner Harbor, Massachusetts.*—The site of the station was protected from the sea by placing about 75 tons of riprap stones on the beach. Various repairs were made.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

86, 87. Ipswich, Mass.	145. Monomoy Point, Cape Cod, Mass.
90, 91. Cape Ann, Mass.	149. Nantucket (Great Point), Mass.
95. Tenpound Island, Mass.	150. Sankaty Head, Mass.
104. Black Rocks, Mass.	152. Gay Head, Marthas Vineyard, Mass.
111, 112. Boston, Mass.	160. Bishop & Clerks, Nantucket Sound, Mass.
114. Narrows, Boston Harbor, Mass.	161, 162. Hyannis, Mass.
117. Deer Island, Boston Harbor, Mass.	165. Cape Poge, Nantucket Sound, Mass.
119, 120. Spectacle Island, Boston Harbor, Mass.	166. Edgartown, Mass.
125. Scituate Breakwater, Mass.	169. East Chop, Mass.
126, 127. Plymouth (Gurnet), Mass.	170. West Chop, Mass.
130. Wood End, Mass.	175. Tarpaulin Cove, Naushon Island, Mass.
131. Long Point, Mass.	183. Ned Point, Mass.
132. Mayo Beach, Mass.	184. Bird Island, Mass.
133. Billingsgate Island, Mass.	
136, 137, 138. Nauset Beach, Mass.	

LIGHT-VESSELS.

108. *Boston light-vessel, No. 54, Boston Bay, entrance to Boston Harbor, Massachusetts.*—This vessel was built of steel in 1892, is of 491 tons displacement, has a steam fog-signal, and is moved by her own propeller. On May 31, 1901, she was brought in for repairs, where she was put in dry dock and her bottom was scraped and painted, and the following-named repairs were made: The girth seams and rivets around the bottom of both boilers were calked, the hand-hole plates were repaired, the blow-off piping was renewed, the air pump was overhauled, two new steel floor plates were fitted in the fire room, a new guard under the boiler fronts, and a new worm for the windlass were fitted. The iron cover of the whistle drum and the ring of the smokestack umbrella were renewed, new fans were fitted to the circulators, Bloomsburg circulators with necessary valves, etc., were furnished and fitted to each boiler, a new pin was fitted to the forward link block of the engine, the distiller pump was overhauled, and the piping of the fire pump was renewed. Wherever necessary the water-column piping was renewed, a few new tubes were put in the port boiler, the anchor tripper was repaired, about 30 feet of main rail was renewed, and a cast-iron hand-hole was fitted in the whistle drum. Upon the completion of her repairs she went to her station, arriving there June 25, 1901, and relief light-vessel No. 58, which had been temporarily marking the station, was withdrawn. She was supplied during the year with engineer stores, lumber, lantern glass, galley ware, a jib sail, blocks, paint, and iron pipe, and the reflectors of her lantern were resilvered.

141. *Pollock Rip Shoals light-vessel, No. 73, Massachusetts.*—The following statement appeared in the Board's last annual report:

An appropriation of \$80,000 was made by the act approved on March 3, 1899, for the establishment of a light-house or light-vessel to mark this shoal. As a suitable light-house could not be built for the sum named, a contract was made and approved

on December 29, 1899, for the building of this light-vessel, which is to be finished in ten months, and the work is now well in hand. By the act approved on June 8, 1900, an appropriation of \$5,000 was made for an automatic towing machine which is to be used on the light-vessel as automatic riding bitts to relieve the tremendous strain upon her moorings. The proper measures are being taken to have this machine placed in the light-vessel.

This vessel is being built by contract and is only about three-fourths finished, although the contract required that it should be delivered on or before October 29, 1900. The contractor has been called to account in this matter.

144. Pollock Rip light-vessel, No. 47, off Chatham, Cape Cod, Massachusetts.—This composite vessel of about 470 tons displacement was built, with a steam fog-signal, in 1891. She was at New Bedford for repairs to her stem, etc., which had been damaged by collision, and while in port other work was done, consisting of repairs to her boiler and machinery, and the calking of her spar and topgallant fore-castle decks. A wildcat was furnished for the windlass, and her metal sheathing was patched. She returned to her station on July 31, 1900. On April 6, 1901, at 9 p. m., a tug towing three barges, in attempting to cross the light-vessel's bow, came in collision, the first two barges striking heavily, carrying away the whole of her false stem, with facing piece, to below the water line. The owners of the barges agreed to pay the cost of repairs. As the light-vessel did not spring a leak, and as it has been necessary to employ relief light-vessel No. 58 on other stations, she has not yet been brought in for repairs. Early in the spring the southwest anchor fouled the ship's mooring chain. The chain was unshackled and the anchor was hoisted to the cathead with both flukes gone. The ship is now riding to the north-east and southeast legs of the moorings, as there has been no convenient opportunity since to lay the other leg. The condition of the vessel is good, with the exception of the damages caused by the collision. She was supplied with eucalyptus, stove linings, rope, galley ware, lumber, a lightning rod, grindstone, iron pipe, and the like.

146. Shovelful Shoal light-vessel, No. 3, off Monomoy Point, Cape Cod, Massachusetts.—This wooden vessel of about 140 tons gross burden was built in 1853, and has a bell for a fog signal. On August 28, 1900, the schooner *Nellie W. Craig* ran into her, striking her on the starboard fore rigging and straining it badly. The managing owner of the schooner paid the bill of repairs. On October 21, 1900, the four-masted schooner *John B. Manning*, while attempting to cross the bow of the light-vessel, fouled her, striking on her port bow, breaking the upper part of the stem piece, crushing and breaking the false rail, knocking out the chocks in the space where the bowsprit formerly rested, opening the seams in the topgallant fore-castle deck, and straining the bulwarks from the deck up, on her port bow. The owner of the schooner paid the bill for repairs. At 4 o'clock on the morning of May 15, 1901, a coal barge in tow of a tug, came in collision with the light-vessel, but beyond chafing the paint on her port bow, and slightly injuring the anchor hanging on the rail, no material damage was done. In August the white stripe of paint around the hull was raised, so that the lower edge is on a level with the spar deck, and the name Shovelful and the number 3 were painted in black on the white stripe. The condition of the vessel is good. She was supplied during the year with rubber hose, rope, galleyware, blocks, a lightning rod, and wire.

147. *Handkerchief light-vessel, No. 4, Nantucket Sound, Massachusetts.*—This wooden vessel of about 104 tons gross burden was built in 1855, and has a bell for a fog signal. She remained on her station during the entire year. She was supplied with rubber hose, stove linings, a lightning rod, and a boat mast.

148. *Great Round Shoal light-vessel, No. 42, off Nantucket, Mass.*—This wooden vessel of about 410 tons gross burden, with a compressed-air fog-signal, was built in 1877. In June, 1900, by the explosion of the lamp used for heating the vaporizer of the fog-signal engine, the woodwork in the engine room was set on fire, endangering the safety of the vessel. She was brought to New Bedford on August 28, 1900, and alterations and repairs were made as follows: Her windlass was repaired, a new brake was furnished, an extension was made aft of the forecastle deck, repairs were made under the forward lantern house and to the copping of the floor, the lanterns were repaired, the copper near the water line was patched, the hoisting winch was repaired, two of the crew's berths were removed, a short bulkhead was erected to make a pantry, a new slide was made over the fire-room companion way, a door was made between the fire room and the berth deck, a new iron grating floor was put in the engine room, two steel oil tanks were placed in the oil rooms, two 5-inch valves were put on the exhaust pipe, a stovepipe was furnished, an iron ladder and steps were placed in the engine room, the floor of the engine room under the vaporizer was protected by iron drip pans, the ventilator was changed from the deck to the engine room, and other repairs were made. The light-vessel returned to her station on October 21, 1900, and relief light-vessel No. 58 was withdrawn. She was supplied during the year with awning, blocks, linoleum, oil carriers, rubber hose, deck lights, and engineer supplies, and her medicine chest was replenished.

151. *Nantucket Shoals light-vessel, No. 66, about 41 miles to the southward and eastward of Nantucket, Mass.*—This composite vessel was built in 1895-96. She is a screw steamer of 530 tons displacement, and has a steam fog-signal and electric-lens lanterns at her fore and main mastheads. On October 26, 1900, this vessel was relieved by light-vessel No. 58, when she came into New Bedford for repairs under her own steam. She was hauled out and her sea valves were overhauled, the main boiler was supplied with a complete set of new tubes, both donkey boilers were retubed, the tanks under the main boiler were removed, the rivets in the seam of the back head and in the girth seam of the boiler were renewed, the feed piping, heater coil, and valves were repaired, the main stop valve on the boiler was overhauled, the main safety valve was repaired, the outboard-delivery pipe, the fresh-water piping, valves, and drains were repaired, the rudder chains and clutch gear were overhauled, the jack-stay slipper on the mainmast was refitted, and ten new lights of glass were fitted to the air ports. Upon hauling the vessel out, a blade of her propeller was found to have been broken. The opposite blade was removed, and therefore she has at present only two blades to her propeller. A new propeller was ordered, but before it reached New Bedford it was necessary to return the vessel to her station on account of the breaking adrift of relief light-vessel No. 58, and it has not yet been convenient to bring her in to have the new propeller put in place. She was placed on her station on December 25, 1900. She was supplied during the year with a new dory, rope, eucalyptus, zinc for the boilers, valves,

pillowcases, galley ware, lumber, yellow metal, and engineer stores, and her medicine chest was replenished.

163. *Cross Rip light-vessel, No. 5, Nantucket Sound, Massachusetts.*—This wooden vessel of about 130 tons burden, new measurement, was built in 1864, and has a bell for a fog-signal. She remained on her station during the entire year. The windlass was repaired. She was supplied with stove linings, rope, lumber, and yellow metal.

164. *Succunneset Shoal light-vessel, No. 6, Nantucket Sound, Massachusetts.*—The date when this wooden vessel was built is unknown, but she was thoroughly repaired in 1880. She is of about 140 tons gross burden, and has a bell for a fog-signal. She was brought in and her yellow metal was repaired, her deck calked, etc., and on July 6, 1900, she was placed on her station. On May 31, 1901, she was brought in to New Bedford and received new stern planking inside and outside, the renewal of the inside bulwarks under the topgallant forecastle deck, a new topgallant forecastle deck, the relining of the floor of the lantern house, the repacking of the port lights, calking around the bow and side, and the furnishing and putting in of a new main and sail mast. She resumed her station on June 28, 1900, and light-vessel No. 9, which had been placed temporarily on the station, was withdrawn. She was supplied, during the year, with blocks, galley ware, stovepipe, canvas, springs for the officers' berths, table cover, a new awning, and the like.

176. *Vineyard Sound light-vessel, No. 41, western entrance to Vineyard Sound, Massachusetts.*—This wooden vessel is of about 387 tons burden, old measurement, and was built in 1876. She has a steam fog-signal. On May 1, 1901, this vessel was brought to New Bedford and received the following-named repairs: Some 25 feet of her starboard rail was renewed, 2 oak side fenders were fitted, new doors were fitted to the engine room, the after companionway slide was renewed, the glass in the cabin skylight was reset, the spar deck was calked, the deck lights were reset, the side light was repaired, yellow metal was supplied for the after lantern-house floor, the lantern houses were recanvased, the oil-room doors were repaired, 4 hard patches were put on the starboard boiler, the back connection was calked and the hand hole was repaired, 4 hard patches were put on the port boiler, 1 new tube was put in, the blow-off flange was bolted on and the seams were calked, the upper pintle of the rudder was repaired, a scupper casting was furnished and put in, 6 bunker plates were put in the deck, new galvanized iron galley pipe was supplied with deck plate and hood, the smokestack turnbuckles were repaired, the davit brackets were bushed and the port davits were straightened, 2 sets of cast-iron double bitts were set up complete on the topgallant forecastle deck, the bell was repaired, 1 pair of triple blocks with iron straps was fitted to the davits, the deck pumps were overhauled and repaired, galvanized iron rudder chains were furnished with eye-bolts and shackles complete. The vessel was returned to her station on May 24, 1901, and light-vessel No. 58, which had taken her place, was withdrawn. She was supplied during the year with engineer stores, blocks, lumber, iron pipe, eucalyptus, zinc, and valves, and slight repairs were made to one of her boats.

177. *Hen and Chickens light-vessel, No. 2, entrance to Buzzards Bay, Massachusetts.*—This wooden vessel was built in 1849. She is of about 120 tons burden, new measurement, and has a bell for a fog-

signal. She remained on her station during the entire year. She was supplied with life-preservers, stovepipe, galley ware, camp stools, and the like. Her medicine chest was replenished.

Relief light-vessel, No. 9.—This wooden vessel was built in 1867. She is of about 103 tons burden, new measurement, and has a bell for a fog-signal. She was on Succunnesset Shoal light-vessel station, and was relieved July 6, 1900, and towed to Woods Hole. On December 20, 1900, she was placed on Nantucket Shoals light-vessel station, remaining five days, when she was brought to New Bedford leaking badly, and was hauled out on the ways and stripped of all her metal, and was calked from plank-sheer to keel. A new sheathing of yellow metal was put on, her rudder head was repaired, a portion of the taff-rail was renewed, several fenders were replaced, and in May, 1901, her spar deck was calked. On May 31, 1901, she replaced Succunnesset Shoal light-vessel, No. 6, while the latter vessel was brought in for repairs. On June 28, 1901, Succunnesset Shoal light-vessel, No. 6, was placed on her station and light-vessel No. 9 was withdrawn. She was supplied during the year with paint and stovepipe.

Relief light-vessel, No. 58.—This iron vessel was built in 1894. She is of about 491 tons displacement, has a steam fog-signal, and is moved by her own propeller. While on Pollock Rip light-vessel station she broke adrift, the moorings having fouled. They were cleared and she was replaced on July 27, 1900. On July 31 Pollock Rip light-vessel, No. 47, was returned to her station and this light-vessel was taken to New Bedford. On August 28, 1900, she relieved Great Round Shoal light-vessel, No. 42, while that vessel was undergoing repairs. When light-vessel No. 42 was returned to her station on October 21, 1900, this light-vessel was taken to New Bedford. While there she was hauled out and her bottom was scraped and painted with two coats of antifouling paint. The stern bearings of the shaft were repacked, two strainers on the outboard delivery were renewed, and two sea cocks were repaired. On October 26, 1900, she relieved Nantucket Shoals light-vessel, No. 66. On December 9, 1900, during a heavy gale, the chain parted about 10 fathoms from the hawse pipe. The chain was new and had been used but a short time. The vessel drifted 70 miles from the station, when the gale moderated and she got up steam. She had almost reached the station when, on account of leaking tubes and increasing wind, she again drifted. The vessel worked to the northward and westward of the station when the wind came out west-southwest and blew a gale, setting her drifting toward the shoals. Steam was put on, and she was headed south to clear shoal water. Some days, on account of leaky tubes, both boilers were without steam. In one boiler 20 tubes and in the other 30 tubes were plugged. The supply of coal was running short and all hands were getting used up. It was therefore thought best to accept the assistance of the first steamer sighted. When the English steamer *Luciline* came along she was signaled for assistance, and she took the light-vessel in tow and brought her to Edgemoor, Del., light-house depot, arriving there on December 17, 1900. From there she was towed to Newport, R. I., by the tender *Zizania*, and from there to New Bedford by the tender *Verbena*, arriving there on December 21, 1900. While in the Fourth light-house district she was supplied with a first-class mushroom anchor and 120 fathoms of 2-inch chain. Upon her arrival in

New Bedford her boilers were retubed, her donkey boiler was taken out, and all connections were plugged, two new water columns with connections were supplied, valve stems on the main engine were fitted, a safety valve was supplied, a galvanized-iron water main was fitted to the tanks, two quadrants were furnished and fitted to the main engine, the engine-room skylight was fitted, the air pump was overhauled, the valve stem and governor on the whistle engine was repaired, two sets of grate bars were furnished, the forward tanks were patched, one new tool locker was furnished and put in, a new ash chute was furnished, three ports were packed, the steam gauges were tested and repaired, a new steering wheel and box were furnished, the skylights were repaired, eight new shutters were furnished, a new binnacle and a new whale-boat were supplied. On May 1, 1901, this vessel relieved Vineyard Sound light-vessel, No. 41, while that vessel was being repaired, and on the return of that vessel to her station on May 24, 1901, this light-vessel was withdrawn. On May 30, 1901, she proceeded, under her own steam, from New Bedford to Boston, arriving there May 31, 1901, relieving Boston light-vessel, No. 54, which was brought in for repairs. Light-vessel No. 54 was returned to her station on June 25, 1901, and this light-vessel came in to Boston, where her main deck was calked. During the year she was supplied with engineer stores, eucalyptus, tube rods, stove linings, towels, ropes, paint, lumber, a dory and sails, a winch frame, galley ware, a new galley range, canvas, and a marine glass. Her compasses were adjusted and her medicine chest was replenished.

DAY OR UNLIGHTED BEACONS.

These are now, with a few exceptions, in good order, and most of them have been painted this season by the crews of the tenders.

Frog Rock, Essex River, Massachusetts.—A hole was drilled for an 8-inch spindle, and a spindle, with day mark, purchased.

Dry Salvages Beacon, off Cape Ann, Massachusetts.—The legs of the tripod were strongly reenforced.

Monument Bar Beacon, Beverly, Massachusetts.—Repairs were made to the beacon and a new staff and cage put on.

Black Rocks Beacon, Lynn Harbor, Massachusetts.—This beacon, which was carried away by a vessel in May, 1901, will not be rebuilt, being no longer necessary.

Glades Flats Beacon, Boston Harbor, Massachusetts.—A new day mark was put in place.

Ledge southwest of Hangmans Island, Quincy Bay, Massachusetts.—A hole was drilled for an 8-inch spindle, and a spindle, with day mark, was purchased.

North Beacon, Scituate Harbor, Massachusetts.—The spar, with day mark, which had been carried away by the ice, was replaced.

South Beacon, Scituate Harbor, Massachusetts.—The spar, with day mark, which had been carried away by the ice, was replaced.

Central Wharf Spindle, Provincetown Harbor, Massachusetts.—A white wooden mast surmounted by a white square cage was erected.

Union Wharf Spindle, Provincetown Harbor, Massachusetts.—A white wooden mast surmounted by a white cask was erected.

FOG-SIGNALS OPERATED BY STEAM, CALORIC, OR OIL ENGINES.

90-91. *Cape Ann, Massachusetts.*—This 10-inch steam whistle was in operation some 714 hours, and consumed about 48 tons of coal.

92. *Eastern Point, Massachusetts.*—This 4,000-pound fog bell was in operation some 515 hours, and consumed about 495 gallons of mineral oil.

108. *Boston light-vessel, No. 54, Massachusetts.*—This 12-inch steam chime whistle was in operation some 697 hours, and consumed about 128 tons of coal.

111. *Boston, Massachusetts.*—This first-class steam siren was in operation some 690 hours, and consumed about 44 tons of coal.

129. *Race Point, Massachusetts.*—This 12-inch steam whistle was in operation some 699 hours, and consumed about 31 tons of coal.

135. *Cape Cod, Massachusetts.*—This first-class Daboll trumpet was in operation some 1,013 hours, and consumed about 508 gallons of mineral oil.

144. *Pollock Rip light-vessel, No. 47, Massachusetts.*—This 12-inch steam chime whistle was in operation some 1,038 hours, and consumed about 97 tons of coal.

148. *Great Round Shoal light-vessel, No. 42, Massachusetts.*—This 10-inch whistle, operated by compressed air, was in operation some 905 hours, and consumed about 3,940 gallons of mineral oil.

157. *Nantucket Shoals light-vessel, No. 66, Massachusetts.*—This 12-inch steam whistle was in operation some 1,345 hours, and consumed about 181 tons of coal.

170. *West Chop, Massachusetts.*—This 10-inch steam whistle was in operation some 619 hours, and consumed about 48 tons of coal.

176. *Vineyard Sound light-vessel, No. 41, Massachusetts.*—This 12-inch steam whistle was in operation some 825 hours, and consumed about 86 tons of coal.

179. *Dumpling Rock, Massachusetts.*—This Daboll trumpet was in operation some 657 hours, and consumed about 889 gallons of mineral oil.

— *Relief light-vessel, No. 58, Massachusetts.*—This 12-inch steam whistle was in operation some 571 hours, and consumed about 81 tons of coal.

BUOYAGE.

On July 6, 1900, the whistling buoy off Newburyport Bar was furnished with a new whistle, the old one being broken. On July 10, 1900, Pollock Rip Slue gas buoy was damaged by a collision. The following day a new buoy was substituted. Three spar buoys in the Merrimac River, temporarily discontinued, were reestablished. On July 26, 1900, two red spar buoys were established in 21 feet of water in Mystic River, Boston Harbor, to mark the dredged channel leading to Island End River. On August 10, 1900, a red and black horizontal-striped spar buoy was placed in 9 feet of water in Buzzards Bay, Massachusetts, designated as Fatal Rock buoy. On August 15, 1900, a gas buoy, to be known as Nonamesset Point Shoal gas buoy, painted black and showing a fixed white light, was established in 18 feet of water on the westerly side of the channel from Vineyard Sound into Woods Hole Great Harbor, in the position formerly occupied by

Nonamesset Point Shoal buoy, a black can. On September 21, 1900, the bell buoy, Broken Part of Pollock Rip, north part, was replaced by a fresh buoy, the striking ball of the old buoy being broken. On September 23, 1900, a new whistle was put on Thieves Ledge whistling buoy, the old one having evidently been stolen. On October 3, 1900, Pollock Rip buoy No. 2, a red spar, was found adrift and was replaced on October 7, 1900. On two other occasions during this same month it was necessary to replace this buoy, it having been fouled by passing tows. On November 22, 1900, Eustis Rock buoy, Buzzards Bay, Massachusetts, a red and black horizontal-striped spar, was established in 15 feet of water on the southerly side and just off the rock, which has 4 feet of water on it. On November 29, 1900, Nix Mate bell buoy, which had gone adrift, was replaced by a new buoy. On December 8, 1900, there was established for experimental purposes a Close bell buoy in 27 feet of water, on Upper Middle, Boston Harbor. On February 8, 1901, this buoy was taken up, being disabled by ice. On April 19, 1901, it was reestablished in 21 feet of water in Broad Sound, near Rams Head gas buoy. Shortly after it was reported missing; it has not since been heard from, and it is probable that it was sunk. On December 19, 1900, Ardanhu Wreck gas buoy, placed on January 29, 1900, to mark the wreck of the steamer *Ardanhu*, in Vineyard Sound, near Robinsons Hole, was discontinued, the wreck having been removed. Northeast Slue Channel whistling buoy, which was dragged from its position, was replaced. On January 15, 1901, Stone Horse Shoal, north end, buoy No. 5 A, was replaced on its station. It was again replaced on January 29, 1901. On February 16, 1901, two red spar buoys were temporarily established on the northerly side of the main ship channel, Boston Harbor, near Governors Island, to mark the location of dredgers which on account of ice were obliged to discontinue their work of deepening the channel. On February 18, 1901, three second-class iron spar buoys were established in 27 feet of water in Boston Harbor to mark the limits of the partially completed dredged channel. They were designated as Dredged Channel buoys Nos. 1 and 3 on the southerly and No. 4 on the northerly side of the channel. On February 20, 1901, Rams Head gas buoy and Upper Middle gas buoy, Boston Harbor, were both found damaged by collision and were replaced by new buoys. On February 27, 1901, the Broken Part of Pollock Rip, north part, bell buoy, was damaged by collision and replaced by another buoy. On March 12, 1901, Nix Mate gas buoy, which had been damaged by a collision, was replaced by another buoy. On April 13, 1901, Point Rip Shoal Mid-Channel buoy, a black and white perpendicular-striped first-class can, was established in 58 feet of water in the channel at the easterly entrance to Nantucket Sound, and off the northeasterly end of Point Rip Shoal. On April 18, 1901, the Broken Part of Pollock Rip, north part, bell buoy was found adrift and was replaced. On May 8, 1901, Browns Bank No. 3, black spar buoy, was moved to a new position and is now in 27 feet of water northwest of the former position, Plymouth Harbor. On May 25, 1901, Northeast Slue Channel whistling buoy, Pollock Rip, was found about 1 mile off its station in a sinking condition, badly damaged by collision. A new buoy was placed on the station. On June 10, 1901, Handkerchief, south part, buoy No. 10, a second-class nun, Nantucket Sound, was moved and reestablished in 24 feet of water. On June 22,

1901, Stone Horse Shoal, north part, buoy No. 5 A, a second-class can, was carried off the station by a passing tow and was replaced the following day.

LIGHT-HOUSE DEPOTS.

Lovells Island, Boston Harbor, Massachusetts.—A wheeling stage was built and repairs were made to the wharf and sills of the coal shed.

Woods Hole, Woods Hole, Massachusetts.—The coal shed, except the roof, was rebuilt, a plank walk was built from the dwelling to the fuel house, the storehouse was repaired, about 4,500 square feet of the wharf was replanked, the water pipes were extended to the wharf for supplying the tenders with fresh water, and some improvements were made to the dwelling.

Castle Island light-house depot, Boston Harbor, Massachusetts.—The following recommendation, made in the Board's last annual report, is renewed:

Extended repairs and improvements are required at the Lovells Island buoy depot, and it is estimated that it would cost \$11,500 to put it in good condition, but this site must now be abandoned, it being required by the War Department. Castle Island, also the property of the United States, is only 2 miles from Boston. It contains Fort Independence, but no modern defenses, while Lovells Island is 6 miles from the city and is to have modern defenses. It is understood that the use of all of Castle Island exterior to the fort is abandoned during the pleasure of the United States to the city for a park, made accessible by a bridge. The area of $1\frac{1}{2}$ acres between the sea wall and the front of the fort that faces the wharf is only a small part of the island and could be easily isolated by building 150 feet of fence from the salients of the fort to the sea wall. It slopes gently from the fort to the wall and would make a good depot—far better than that at Lovells Island—and better than it is possible to obtain anywhere else in Boston Harbor or its vicinity. By enlarging the present wharf a well-sheltered berth could be formed where two tenders could lie at all times, saving wharfage at Boston, which is becoming more and more costly and difficult to obtain. The depot and tender would be in close communication with the inspector's office by telephone and electric car, and the labor of the crews of the tenders could be utilized to the utmost at the depot and much of their time saved which is now lost. The ultimate cost of establishing a depot at Castle Island for wharf, storehouse, coal shed, keeper's dwelling, railway with car, derrick, and skids is estimated at \$25,000. Recommendation is therefore made that an appropriation of this amount be made therefor.

Machine shop, Boston, Mass.—Repairs to the illuminating apparatus, the fog-signal apparatus, and to the iron work for structures in the First and Second districts were in progress in the shop throughout the year, including the improvement of the fog-signal plant, the installation of improved machinery for fog-signals by compressed air, the rebuilding of revolving clocks for the optical apparatus, and of striking machines for fog-bells, besides miscellaneous minor repairs.

LIGHT-HOUSE TENDERS.

Mayflower.—This steel screw steamer was built in 1897 and is of about 572 tons gross burden. She was employed during the entire year, with the exception of 24 days when she was laid up for repairs. She changed or replaced 359 buoys, painted 67 buoys and 27 beacons, delivered to light-vessels and stations 467 tons of coal and 30 cords of wood, besides 117 loads of rations and supplies. She was employed 30 days at the buoy depot. During the year she steamed 8,960 miles and consumed about 1,448 tons of coal. On November 1, 1900, she was hauled out and her bottom was scraped and painted. On Novem-

ber 5, 1900, she came out of dry dock and her donkey boiler was retubed and she was thoroughly painted. The engineer force repaired and washed out the boilers. On November 16, 1900, she proceeded to the general light-house depot and returned with a load of buoys, chain, ballast balls, etc., arriving at Boston on November 29, 1900. While there her launch was repaired. On May 22, 1901, she went into dry dock, her bottom was scraped and painted, repairs were made to her boilers, the method of attaching the boat blocks to the davits was changed, iron clamps were fitted to the shutters, the canvas on the upper deck was renewed, four dead lights were refitted, a new steel crossbeam for the main hatch was supplied, the saloon, bath, and staterooms were painted, the flag-pole balls and name were regilded, two new pilot-house doors were fitted, the plumbing was overhauled, the ice chest was lined with zinc, and the machinery and electric bells were overhauled. Alterations were also made in the assistant engineer's room and in the passage way from the forward part of the ship to the saloon. She was supplied during the year with engineer stores, tube rods, linoleum, sheets, towels, blocks, rubber hose, zinc, rugs, a rotator for the log, paints, blankets, grate bars, galleyware, silver and glass ware, crockery, stove linings, and rope. The medicine chest was replenished and twice during the year her compasses were adjusted.

Azalea.—This steel screw steamer was built in 1891 and is of 422.80 tons displacement. She was in constant service except for 40 days when under repair. She changed or replaced 130 buoys, painted 162 buoys, delivered 717 tons of coal and 179 loads of rations and supplies to light vessels and stations. She was employed 57 days at the buoy depot. During the year she steamed 13,914 miles and consumed about 1,150 tons of coal. In October, 1900, she was hauled on the New Bedford railway and her bottom was scraped and painted by the crew. In November her boilers were repaired and a new inner smokestack was furnished and set up. Slight repairs were made to the boilers in January. Contract was made for the construction and installation of a new boiler. In February, 1901, repairs were made to her boilers and the vessel was painted. Slight repairs were again made to her boilers in April. She was supplied during the year with paint, rope, tableware, blocks, mattresses, fire brick, engineer supplies, belaying pins, wire rope, grate bars, life preservers, rubber hose, sheet lead, brass piping, lumber, linen, crockery, blankets, and galley ware. The furniture of the saloon and master's room was covered anew.

Verbena.—This wooden side-wheel steamer was built in 1870 and is of about 294 tons gross burden. She was employed during the entire year except for 29 days when under repairs. She changed and replaced 220 buoys, painted 52 buoys and 14 beacons, delivered 110 tons of coal and 75 loads of rations and supplies to light vessels and stations. She was employed 31 days at the light-house depot. During the year she steamed 7,331 miles and consumed about 872 tons of coal. In October, 1900, her boilers were washed out, the piping was repaired, repairs were made to the gangway, and a new smokestack was furnished and set up. On December 19, 1900, she went to Newport, R. I., for light-vessel No. 58, and brought her to New Bedford. On December 24, 1900, she was hauled out, her bottom was cleaned and received 45 sheets of new yellow metal. On January 31, 1901, this tender went to the General Light-House Depot and returned

with a load of buoys. She also received a new alco-vapor launch. The tender's davits and decks had been previously strengthened in order to handle the launch with safety. On March 15, 1901, her boiler was cleaned and a new crank pin was put in the main engine. New crank-pin brasses, a beam center, cross head, link and fork end brasses were supplied, and the plumbing of the bathroom was overhauled. In March, 1901, repairs were made to her guards and in May her upper deck was recanvased, a new derrick boom and a wildcat for the windlass were supplied. She was furnished during the year with blocks, paint, rope, engineer stores, electrical supplies, rugs, boat blankets, rubber hose, galley ware, brass piping, a vertical steam pump, grate bars, canvas, crockery, linen, mattresses, her boat cushions were made over, her medicine chest was replenished, and a new rug and curtains were supplied in the saloon.

Myrtle.—This wooden screw steamer was built in 1872, and is about 348 tons gross burden. She was laid up for repairs from May 27 to June 30, 1901. A new tail shaft was put in, the propeller recast, the steam-steering gear was taken out, thoroughly overhauled, and installed on a new foundation, the rudder and throttle valve were repaired, soft patches were put on the starboard and port furnaces and on the starboard, middle, and port water legs of the boiler, and the working boats were overhauled and repaired. She steamed some 10,050 miles and consumed about 654 tons of coal. Except during the time she was laid up for repairs, she was incessantly occupied in delivering materials at stations.

THIRD DISTRICT.

This district extends from Elisha Ledge, off Warren Point, Rhode Island, to a point on the coast of New Jersey, opposite Shrewsbury Rocks, and includes the ledge and the rocks. It embraces all aids to navigation on the coasts of Rhode Island, Connecticut, and New York, and of New Jersey northward of the point opposite Shrewsbury Rocks, and on all tidal waters tributary to the sea or Long Island Sound between the limits named, together with the aids on Whitehall Narrows and on the United States waters of Lakes Champlain and Memphremagog.

It now includes the light-house service of Porto Rico, and the adjacent islands, and the waters of the islands lying east of the seventy-fourth meridian of longitude west of Greenwich, which were ceded to the United States by the Government of Spain by treaty entered into on December 10, 1898.

Inspector.—Capt. (now Rear-Admiral) E. M. Shepard, United States Navy, to May 15, 1901; Capt. William M. Folger, United States Navy, from May 15, 1901.

Engineer.—Lieut. Col. David Porter Heap, Corps of Engineers, United States Army.

There are in this district—

Light-houses and beacon lights, including 97 post lights	271
Light-houses in Porto Rico	15
Light-vessels in position	8
Light-vessels for relief	3
Day or unlighted beacons	47
Fog-signals operated by caloric or oil engines	29
Fog-signals operated by clockwork	59
Electric-lighted buoys	11
Sas-lighted buoys	12
Whistling buoys in position	5
Bell buoys in position	29
Other buoys in position	579
Steamer <i>Armeria</i> , used for supplying the light-stations of the Atlantic and Gulf coasts	1
Steamers <i>John Rodgers</i> and <i>Cactus</i> , buoy tenders, and for supply and inspection of light-stations	2
Steamer <i>Gardenia</i> , buoy tender and for freight	1
Steamers <i>Mistletoe</i> and <i>Iris</i> , used for works of construction and repair of light-stations, fog-signals, and day beacons	2
Steam launch <i>Nettle</i> , for works of construction and repair on Lake Champlain ..	1
Steam launch <i>Daisy</i>	1

[LIGHT-STATIONS.

188. *Beavertail, Rhode Island*.—The fog-signal here was improved by the installation of a conical siren, which, with other minor improvements and changes suggested by long-continued experiments and tests, seems now to meet all the requirements of navigators. Various repairs were made.

193. *Rose Island, Rhode Island*.—A brick oil house was built. Minor repairs were made.

197. *Hog Island Shoal, Rhode Island*.—On June 30, 1901, the foundation cylinder was completed and the work of erecting the superstructure was begun.

201. *Borden Flats, Massachusetts*.—On December 3, 1900, the fifth-order fixed white light was changed to a flashing white light.

204. *Plum Beach, Rhode Island*.—The following recommendation made in the Board's last two annual reports is renewed:

It is estimated that a fog-signal could be established at a cost of \$1,343, and it is recommended that an appropriation of this amount be made therefor.

206. *Comanicut Island, Rhode Island*.—A brick oil house was built. The fog-signal, engine, etc., were overhauled and a heater to prevent freezing of the engine was furnished.

208. *Warwick, Rhode Island*.—The fog-signal engines, etc., were overhauled. The characteristic of the blower siren fog-signal was changed on June 15, 1901, from a continuous blast to blasts of 3 seconds' duration, separated by silent intervals of 3 seconds.

210. *Conimicut, Rhode Island*.—Some 606 tons of riprap were placed for the protection of the station.

213. *Pomham Rocks, Rhode Island*.—On June 15, 1901, the characteristic of the fog-signal was changed from a continuous blast to blasts of 3 seconds' duration, separated by silent intervals of 12 seconds. A brick oil house was built, and the fog-signal apparatus was overhauled. Minor repairs were made.

215. *Sassafras Point, Rhode Island*.—On November 15, 1900, the color of the lens lantern light was changed from white to red. Minor repairs were made.

221. *Great Salt Pond Breakwater (Outer End) Beacon, Rhode Island*.—The fog-signal at this station will be reestablished as soon as the repairs to breakwater have been completed by the War Department.

222. *Great Salt Pond Breakwater (Inner End) Beacon, Rhode Island*.—A post was set and fitted for changing the light from a post lantern to a lens lantern.

225. *Stonington Outer Breakwater (easterly end) Beacon, Connecticut*.—On June 30, 1901, a fixed red-lantern light was established on the end of the breakwater.

227. *Latimer Reef, New York*.—Some 405 tons of riprap was placed for the protection of the station. Minor repairs were made.

— *Black Ledge, New London Harbor, Long Island Sound, Connecticut*.—The following recommendation was made in nine recent annual reports of the Board:

The necessity for establishing a light and an efficient fog-signal in such a position as to enable vessels to enter and leave the harbor of New London, Conn., has become evident, and especially so for the aid of those approaching from seaward.

The numerous outlying shoals and ledges surrounding the entrance to this harbor make the approach to it dangerous in thick weather. The location of the present New London light and fog-signal station is so far inside the obstructions as to be partially ineffective as an aid for the purpose of safe navigation of this entrance. The commerce of the port of New London has so increased since the erection of the present light as to change the conditions materially. In view of these facts and the further fact that a naval station is in operation on the Thames River, which empties into New London Harbor, it is suggested that a light and fog-signal station be established on the southwest ledge on the eastern side of the entrance to New London Harbor. Estimate is made that it can be done for \$45,000. It is therefore recommended that an appropriation for that amount be made therefor.

The Board estimated in 1900, and again estimates, that as prices are at the present time \$60,000 will be required for this work, and recommendation is therefore made that an appropriation for that amount be made therefor.

251. *Race Rock, New York*.—On June 8, 1901, the duplicate 7½-horsepower oil-burning engines for the fog-signal were installed. Various repairs were made.

254. *Plum Island, New York*.—A brick oil house was erected and 700 running feet of wire boundary fence was built, inclosing the light-house reservation. Various repairs were made.

256. *Long Beach Bar, New York*.—The lower boat landing was rebuilt and 400 tons of riprap placed for the protection of the station.

301. *Falkner Island, Connecticut*.—On June 30, 1901, the fourth-order lens, showing a fixed white light varied by a white flash every 90 seconds, was replaced by a lens of the same order, showing a flashing white light every 15 seconds.

306. *New Haven Outer Breakwater, Connecticut*.—Some 2,023 tons of riprap were placed for the protection of the station. The fourth course of foundation cylinder plates omitted from this station was removed on December 12, 1900, for use as the first course of the foundation cylinder for Hog Island Shoal Light-House Station, in accordance with the modified contract for that work. Various repairs were made.

307. *New Haven Long Wharf, Connecticut*.—On July 24 the intensity of the light was increased by changing from a lens lantern to a locomotive headlight lantern. Various repairs were made.

311. *Stratford Shoal, New York*.—Some 400 tons of riprap were placed for the protection of the station. Various repairs were made.

312. *Port Jefferson East Breakwater Beacon, New York*.—On July 25, 1900, the color of the light was changed from red to white, its intensity increased by changing from a pressed glass to a lens lantern, and the height of the focal plane above mean high water was reduced to 30 feet. Various repairs were made.

313. *Port Jefferson West Breakwater Beacon, New York*.—On July 25, 1900, the color of the light was changed from fixed white to fixed red.

314. *Old Field Point, New York*.—Some 600 running feet of wire line fence and 150 running feet of garden picket fence were built. Various repairs were made.

318. *Penfield Reef, Connecticut*.—The undermined portions of the pier were pinned up with bags of concrete. Some 600 tons of riprap were placed for the protection of the station. Various repairs were made.

319. *Pecks Ledge, Norwalk Harbor, Long Island Sound, Connecticut*.—An appropriation of \$10,000 was made by the act approved on March 3, 1901, for a light and fog-signal at this place. Since it was decided that it must be made large enough to accommodate two keepers, it has been found that it would cost nearly as much as the light-station erected at Greens Ledge. It is therefore estimated that a suitable light-house and fog-signal on Pecks Ledge will cost \$29,000 in addition to the \$10,000 already appropriated. The Board therefore recommends that \$29,000 be appropriated therefor.

320-323. *Grassy Hammock, Round Beach, Fitchs Point, and White Rock Reef Beacons, Norwalk Harbor, Connecticut*.—The \$600 appropriated by act approved March 3, 1899, having been found inade-

quate for the construction of these beacons, and an additional appropriation of \$400 having been made by act approved March 3, 1901, proposals were invited again, but when received on June 28, 1901, were rejected, the lowest bid, \$1,100, being in excess of the sum appropriated. The beacons will be built by mechanics in the employ of the light-house engineer.

324. *Long Beach, Norwalk Harbor, Connecticut.*—The act approved March 3, 1901, appropriated \$2,500 to establish a light on the Long Beach Day Beacon. Work on this will soon be commenced.

326. *Greens Ledge, Connecticut.*—On January 30, 1901, the fourth section of the foundation cylinder had been completed and filled with concrete; the fifth and part of the sixth section were erected and fitted in place.

329. *Cold Spring Harbor, New York.*—An oil house was built. Minor repairs were made.

338. *Execution Rocks, New York.*—Some 400 tons of riprap were placed for the protection of the station. Various repairs were made.

340. *Hart Island fog-signal, New York.*—Efforts to obtain cession of jurisdiction or title to the site necessary for the fog-signal—for which an appropriation of \$2,500 was made by act approved July 1, 1898—having failed, and it being impossible to build the signal for the amount appropriated, the attempt to construct it is abandoned for the present.

342. *Throgs Neck, Long Island Sound, New York.*—This light-house is now on the northeasterly side of Fort Schuyler, southeasterly end of Throgs Neck, N. Y., and on the northerly side of the entrance from Long Island Sound into the East River. The present location of the tower and keeper's dwelling is objectionable from a military point of view, as they are in the field of fire of batteries recently constructed. Hence the Board recommends that the following-named changes be made at the station in question:

That a small light-house be built on the bastion, A, of the cover face land front, Fort Schuyler.

That an iron stairway be built along the face of the wall to reach the light-house.

That the building, G, be put in proper repair so as to serve as a residence for the light-keeper in case it can be secured from the War Department.

That the ground be fenced in as a light-house reservation, leaving a gate and right of way to the bakery, H, for the use of the post.

That the fog-signal building be left in its present position for the present.

That when the work mentioned above is completed the present light-house be taken down and stored at the light-house depot for future use.

That the dwelling be taken down, storing such material at the light-house depot as can be used again.

It is estimated that the work proposed will cost as follows:

Taking down present light-house and storing it at light-house depot	\$600. 00
Taking down keeper's residence and outbuildings	400. 00
Building new tower on cover face, A, of Fort Schuyler	6, 000. 00
Iron stairway to reach tower	300. 00
Repairing old building, G	2, 250. 00
Fencing, gates, grading, etc	250. 00
Contingencies, 10 per cent	980. 00

10, 780. 00

The Board therefore recommends that an appropriation of \$10,780 be made therefor.

346. *Oak Bluff post light, New York.*—In order to lessen vibration the post was shortened 8 feet and the lights were correspondingly lowered.

347. *North Brother Island, New York.*—A brick oil house was built. Various repairs were made.

352. *Mill Rock (northerly), New York.* 353. *Mill Rock (southerly), New York.*—The establishment of two post lights, one on each end of Mill Rock, was authorized.

356. *Patchogue Breakwater beacon, New York.*—This beacon—a fixed white lantern light on southerly end of breakwater—was established January 10, 1901.

358. *Fire Island, New York.*—Fifty-four running feet of damaged foundation wall, on south side, was replaced, the east wall was repaired and partly replaced, the flagging of the pier was relaid, the pier fence was repaired and portions were rebuilt. Minor repairs were made.

377. *North Hook beacon, New Jersey.*—The removal of the fog-signal, in accordance with the request of the War Department, from in front of the 12-inch battery No. 3 to the east end of the gorge wall of Fort Hancock, including new buildings and transfer of machinery, was completed and old fog-signal house demolished in August, 1900. New coal-hoisting gear, fog-signal, smokestack, and sundry new parts for the boilers, engines, and signals were furnished and fitted. Various repairs were made.

380. *Waackaack Range beacon, New Jersey.*—Some 1,600 running feet of four-strand galvanized-iron wire reservation fence was built. The old range lens from the abandoned tower was brought to the general light-house depot. Various repairs were made.

The following recommendation, made in the Board's last annual report, is renewed:

The present quarters for the light-keepers are inadequate. Recommendation was made in annual reports of 1896, 1897, 1898, and 1899, that either an addition to the old dwelling or new quarters be built. The Board is now of opinion that new quarters should be provided. It is estimated that this can be done for not exceeding \$3,500, and it is recommended that an appropriation of this amount be made therefor.

383. *Conover beacon (front), New Jersey.*—The base of the tower was repaired, and 300 running feet of plank walk was laid. The day marks were rebuilt, their height increased 30 feet, and their color changed from black to white, with diagonal black cross. Various repairs were made.

386. *Romer Shoal, New York.*—An oil house was built. Some 300 tons of riprap were placed for the protection of the station. Various repairs were made.

387. *West Bank, New York.*—The following is a statement in detail of the work of erecting this station under contract: In July, 1900, the bench mark was established and the site was excavated to a depth varying from 8 to 10 feet below the bottom. In August the first, second, third, and fourth sections of the foundation cylinder plates were sunk in position. The entire metal work of the superstructure, weighing 135,000 pounds, was delivered at the depot. In September the concrete filling of the first, second, third, and fourth sections of the cylinder was completed. The excavation of the exterior was filled

with gravel. Some 250 tons of riprap were deposited, and the fifth, sixth, and seventh courses of foundation cylinder plates were prepared for lowering into position. In October the fifth, sixth, seventh, and eighth courses of foundation cylinder plates were fitted into position, and the ninth course was in progress; concrete filling was brought up to the level of the cellar floor. In November the ninth and last course of foundation cylinder was completed, the erection of superstructure was begun and completed, and the lantern deck and watershed begun. In December the erection of the station was completed. On January 1, 1901, a fixed white light of the fourth order, with red sector, was established. On June 1 a blower siren signal was established consisting of 2 oil-burning engines, each of 2 horsepower with No. 2 blower, 1 blower, 1 blower siren, 1 copper horn, 1 blast device, and 1 blast gate to sound blasts of 2 seconds duration, separated by alternate silent intervals of 2 and 5 seconds. On June 12 the eighth load of riprap was delivered, making a total of 1,528 tons, furnished and placed under contract for the protection of the station.

394. *Fort Tompkins, New York.*—The act approved March 3, 1901, appropriated \$12,900 to remove this light and to establish a light and fog-signal at Fort Wadsworth. As the site for the keeper's dwelling on the north corner of the Appleton tract, ceded by the War Department in 1898, has since been occupied by that Department, another site has been selected. Various repairs were made.

399. *Governors Island post light, New York.*—An improved fog-signal was installed November 12, 1900, consisting of a blower siren operated by a 2½-horsepower oil engine, to sound a continuous blast. Various repairs were made.

416. *Jeffreys Hook post light, Hudson River, New York.*—Permission has been obtained from the department of public parks of New York City to occupy the necessary site for a fog-signal and a more powerful light, which are urgently needed at this point. The estimated cost of establishing the proposed light and fog-signal is \$1,400.

The following recommendation, which was made in the Board's last six annual reports, is renewed:

A larger light and a fog bell here would be valuable aids to navigation. The point extends well out into the river, with deep water close to its outer end. The usual route of steamers passing up or down the river is close to the point. The present post light should be replaced by a new structure, upon which should be the lantern with the bell below.

It is estimated that these can be established for not exceeding \$1,400, and it is recommended that an appropriation of this amount be made therefor.

420. *Iona Island, Hudson River, New York.*—The following recommendation, made in the Board's last five annual reports, is renewed:

The post light at this station is of no service during thick weather. A fog-signal is needed during fog, in addition to the light, by the important commerce of this river. It is estimated that a fog-signal can be established here for a sum not exceeding \$1,200, and it is recommended that an appropriation of this amount be made therefor.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

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| <ul style="list-style-type: none"> 186. Sakonnet, R. I. 190. Fort Adams fog-signal station, R. I. 192. Newport Harbor, R. I. 194. Gull Rocks, R. I. 195. Gould Island, R. I. 196. Prudence Island, R. I. 199. Muscle Bed Shoals, R. I. 200. Bristol Ferry, R. I. 202. Whale Rock, R. I. 211. Bullock Point, R. I. 212. Sabine Point, R. I. 214. Fuller Rock, R. I. 216. Point Judith, R. I. 217. Block Island (North), R. I. 218. Block Island Breakwater (front), R. I. 220. Block Island (S. E.), R. I. 224. Montauk Point, N. Y. 229. Morgan Point, Conn. 230. North Dimpling, N. Y. 231. New London Harbor, Conn. — New London buoy and coal wharf, Conn. 252. Little Gull Island, N. Y. 255. Orient Point, N. Y. 257. Cedar Island, N. Y. 259. Saybrook Breakwater, Conn. 260. Saybrook (Lynde Point), Conn. 300. Duck Island Breakwater beacon, Conn. 303. Southwest Ledge, Conn. 304. New Haven Middle Breakwater (east end) beacon, Conn. 309. Housatonic River Breakwater beacon, Conn. 315. Bridgeport Harbor, Conn. 317. Black Rock, Conn. 325. Norwalk Islands, Conn. 327. Eatons Neck, N. Y. 328. Lloyd Harbor, N. Y. 330. Stamford Harbor, Conn. 333. Great Captain Island, N. Y. 334. Jones Rocks Beacon, Conn. 339. Sands Point, N. Y. 341. Stepping Stones, N. Y. 342. Throgs Neck, N. Y. 345. Rikers Island post light, N. Y. | <ul style="list-style-type: none"> 348. South Brother Island ledge post light, N. Y. 349. Lawrence Point ledge post light, N. Y. 350. Sunken Meadows post light, N. Y. 351. Hell Gate post light, N. Y. 355. Shinnecock Bay, N. Y. 864-365. Navesink, N. J. — Sandy Hook electric buoy station, N. J. 375. Sandy Hook (rear) Range, N. J. 376. South Hook beacon (front) range, N. J. 378. Sandy Hook fog bell, N. J. 379. Point Comfort range beacon, N. J. 384. Chapel Hill beacon (rear), N. J. 385. Old Orchard Shoal, N. Y. 393. Coney Island, N. Y. 395. Fort Wadsworth fog-signal station, N. Y. 397. Robbins Reef, N. Y. 398. Liberty Enlightening the World, N. Y. 400. Governors Island (east end) fog-signal station, N. Y. 401. United States Dike Beacon No. 1, N. J. 402. United States Dike Beacon No. 3, N. J. 403. Lower Rocky Point Beacon No. 2, N. J. 404. Low Moor Beacon No. 7, N. J. 405. Little Silver Beacon No. 9, N. J. 406. Sands Point Beacon No. 4, N. J. 408. Great Beds, N. Y. and N. J. 414. Passaic, N. J. 415. Elbow Beacon, N. J. 417. Tarrytown, N. Y. 418. Rockland Lake, N. Y. 425. Esopus Meadows, N. Y. 426. Rondout, N. Y. 431. Saugerties, N. Y. 440. Four-Mile Point, N. Y. (Hudson River). 3. Newport wharf, Vt. 5. Rouse Point pierhead, N. Y. 11. Gordon Landing pierhead, Vt. 22. Barber Point, N. Y. |
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PORTO RICO.

On May 1, 1900, the Light-House Board was directed to take charge of the Porto Rican light-house service. The Board, with the approval of the Secretary of the Treasury, at its session of May 7, 1900, ordered that—

the boundaries of the Third light-house district be extended so as to include within it the island of Porto Rico and the adjacent islands and the waters of the islands lying east of the seventy-fourth meridian of longitude west of Greenwich which were ceded to the United States by the Government of Spain by treaty entered into on the 10th day of December, 1898.

A commander of the United States Navy is stationed at San Juan, P. R., and assigned to duty as assistant to the inspector of the Third district. He has an office at the naval station in San Juan, with two clerks and a messenger. A buoy depot and a store for supplies are temporarily provided, and the U. S. steam tug *Uncas* is assigned, when not otherwise employed by the Navy, for buoy service and for delivering supplies and materials for building and repairs at the 15 Porto Rican light-stations.

A captain of the Corps of Engineers is in charge of the construction and repair of the Porto Rican light-houses, as assistant to the engineer, Third light-house district. Both these officers are disbursing officers, so that payments can be made on the spot.

A supply of buoys and appendages and paints was shipped to San Juan, together with a quantity of light-house supplies, including rations and boats for the more isolated stations. The work of assimilating the Porto Rican light-house service to the General Light-House Service has been completed.

The Porto Rican light-stations were inspected in January, 1901. At that time their condition was good to excellent.

1148. Port San Juan, on the fortification known as the Morro Castle, on the easterly side of the entrance to San Juan Harbor, Porto Rico.—This third-order light is fixed white, varied by a white flash every minute, is 171 feet above high water, and can be seen at a distance of 18 miles. The light is shown from a gray octagonal iron tower, which is 46 feet high from its base. The light was established in 1853 by the Spanish. The present tower was built by the insular government in 1899. The photograph herewith shows the tower as seen near by. Minor repairs were made.

1149. Cape San Juan, Atlantic Ocean, on the northeasterly point of Porto Rico and near the town of Fajardo, P. R.—The light is fixed white, varied by a red flash every three minutes, is of the third order, is 260 feet above the level of the sea, and can be seen at a distance of 18 miles. It is shown from a cylindrical tower arising from the front of a rectangular building, painted blue, with white trimmings. The tower is 39 feet in height from the base of the structure. This light was begun in 1878 and was finished in 1880 by the Spanish, at a cost of 16,300 pesos. It is a guide along the northerly and easterly coast of Porto Rico. The photograph herewith was taken from near by. Minor repairs were made to buildings.

1150. Culebrita Island, in the Virgin Passage, between the Atlantic Ocean and the Caribbean Sea, on the east of the southern side of Culebrita Island, on the western side of the Virgin Passage, and about 22 miles to the eastward of Porto Rico.—This fourth-order fixed white light is 305 feet above high water, is visible 12 miles, is shown from a cylindrical tower on the one-story, flat-roof, stone-colored dwelling. The tower is 37 feet high from its base, was begun in 1882 and finished in 1885 by the Spanish, at a cost of 39,000 pesos. It serves to guide through the Virgin Passage. The landing pier was extensively repaired, the roof of the dwelling was cemented to stop the leaks, some outside pointing was done, the inside of the tower was scraped and painted, and the interior walls, the pump, and plumbing were repaired.

1151. Point Mulás, Caribbean Sea, on the easterly side of Port Mulás, on the northerly shore of Viequez or Crab Island, and about 10 miles to the east of Porto Rico.—It is a fixed red light of the sixth

order, about 68 feet above high water, visible for $7\frac{1}{2}$ miles; is shown from an octagonal tower in the center of the front of a one-story flat-roof dwelling which is light blue with white trimmings. The tower is 27 feet high from its base. It was begun in 1895 and was finished in 1896 by the Spanish, at a cost of 14,500 pesos. It is used to guide along the northerly coast of Viequez or Crab Island. The iron railing was repainted, the sewer was cleaned, a ditch was dug. The walk in front of the dwelling was cemented and the interior walls were repaired in places.

1152. Port Ferro, Caribbean Sea, on the westerly side of the entrance to Port Ferro, on the southerly shore of Viequez or Crab Island, about 10 miles to the east of Porto Rico.—This light is of the third order, flashing white every 5 seconds. It is 68 feet above high water and is visible $13\frac{1}{2}$ miles. It is shown from an octagonal tower with a black lantern in the center of the square flat-roof white building which has gray trimmings. The tower is 38 feet high from its base. It was begun in 1896 by the Spanish and finished in 1899 by the Americans. The Spanish spent on it 20,000 pesos and the Americans \$4,697.65. The roof was cemented in places to stop leaks. The leaks in the cowl of the lantern were stopped and the exterior and interior walls were repaired.

1153. Point Tuna, Caribbean Sea, on the southeasterly shore of Porto Rico.—The light consists of two flashes in group, every 2 minutes; each flash is $7\frac{1}{2}$ seconds long. One eclipse is of 15 seconds and the other of 20 seconds. The light is of the third order, is shown 110 feet above high water, and is visible for 18 nautical miles. It is shown from an octagonal white tower on a square, dark gray, one-story flat-roof dwelling with white trimmings. The tower is 43 feet high from its base. The light was begun in 1891 and was finished in 1893 by the Spanish, at a cost of 26,500 pesos. It is used to guide along the easterly and southerly coasts of Porto Rico. The cut herewith shown was taken near by. In March, 1901, the rain-water cistern was repaired, as it leaked so badly that the keepers were without water except such as was brought from a distance. Strainers were fitted to the water leaders; the road to the landing was graded and repaired; the road and sewers, the interior walls and the coping of the tower, the floors, and exterior walks were repaired. The lens machinery was also overhauled; the plaster in the dwelling was patched and repaired; the oil-room floor was recemented; leaks were stopped in the roof, and the door of the dwelling was repaired.

1154. Point Figuras, on the southerly side of Porto Rico, on the easterly side of Port Arroyo, Caribbean Sea.—This fifth order fixed white light is 47 feet above high water, is visible 12 miles, and is shown from an octagonal tower in the center of the front of a one-story, flat-roofed dwelling which is dark gray with white trimmings. The tower is 36 feet high from its base and was begun in 1892 and finished in 1893 by the Spanish, at a cost of 18,300 pesos. This light guides along the southerly coast of Porto Rico to Arroyo Bay. The swamp north of the light-house was drained, a fence was made and fitted by the gate; strainers were fitted in the leaders, the broken glass in the windows was repaired, and the interior walls and walks were repaired with cement.

1155. Muertos Island, Caribbean Sea, about $5\frac{1}{2}$ miles to the southward of Porto Rico.—This light-station is on the summit and in the

center of Muertos Island. The light is fixed white, varied by a white flash every three minutes, is of the third order, is 297 feet above high water, and is visible for 18 miles. It is shown from a cylindrical tower on the center of a one-story, flat-roofed dwelling, which is gray with white trimmings. The tower is 41 feet high from its base. The light was begun in 1882 and was finished in 1885 by the Spanish, at a cost of 39,412 pesos, and it is used as a guide along the southerly coast of Porto Rico. The lamp and clockwork of the lens were repaired, a new cover was fitted to the cistern, the windows were repaired, the walk around the building and exterior and interior walls were cemented, and the lens clock was repaired. The photograph shown herewith was taken from near by.

1156. *Cardona Island, Caribbean Sea, entrance to Port Ponce, on the southerly shore of Porto Rico.*—This sixth-order fixed red light is 46 feet above high water, is visible $7\frac{1}{2}$ miles, is shown from a cylindrical tower in the center of the front of a one-story flat-roof dwelling which is blue with white trimmings. The tower is 31 feet high from its base. was commenced in 1887 and was finished in 1889 by the Spanish, at a cost of 11,760 pesos, and is used to guide to the entrance of Port Ponce. The cracks in the walls, the roof, and the exterior walk were repaired with cement; the grounds about the dwelling were graded, locks were fitted to three doors, the cistern was repaired, and new chains were fitted.

1157. *Guanica, Caribbean Sea, entrance to Port Guanica, southerly shore of the westerly part of Porto Rico.*—This sixth-order light is fixed white, is 117 feet above high water, can be seen 8 miles, is shown from an octagonal red brick tower in the center of a one-story flat-roof gray building with red brick trimmings. The tower is 32 feet high from its base. It was begun in 1892 and was finished in 1893 by the Spanish, at a cost of 14,900 pesos. The walls, ceilings, floors, and exterior walks were repaired with cement. A stone rubble wall was built to protect the dwelling from the wash of sand and gravel during the rains.

1159. *Mona Island, on the island of that name, which lies about 37 miles from Porto Rico and Santo Domingo and nearly midway between them in the Mona Passage, and between the Atlantic Ocean and the Caribbean Sea.*—The Spanish Government had deposited near the beach a large quantity of material for the erection of two large steel buildings for keepers' dwellings and a steel tower to support the light. During the several years that this material was stored it became much rusted and many parts disappeared. The American military government determined to erect this light, and selected a site for it. Little was done until October 1, 1899, when the Porto Rican board of public works assumed charge. This work was then carried on under great difficulties. The materials on hand had to be transported from the seashore to the site, up some 231 feet, more than a mile over a surface so rough that it required much ballasting and blasting. The light-house proper was completed and the light service was inaugurated on April 30, 1900, at which time about three months' work remained to be done to complete the station. The erection of the Mona Island light-house buildings was continued with funds from the appropriation for repairs of light-houses, 1900, and from the appropriation of \$60,000 made by the act approved June 6, 1900, for the Porto Rican light-house service. The structures consist of a steel tower, bearing

the lantern, and a steel constructed wood-lined dwelling for the keepers, together with two concrete cisterns—one at the dwelling and one about half a mile distant. Mona Island, which is uninhabited, is about $6\frac{1}{2}$ miles long and 5 miles wide, and is without a harbor. The vessels coming here for phosphate and guano anchor in the open roadstead. When storms arise from the eastward these vessels, it is said, drop both their anchors and veer out all their chain cables. The crews then take to their boats and go ashore. In too many cases the vessels follow them. Within the last two years eleven such vessels were wrecked. The light, which is of the second order, is fixed white, varied by a white flash every two minutes. It is 231 feet above high water, and is visible 20 nautical miles. It is shown on the east cape of the island from a hexagonal, pyramidal, black skeleton-steel tower, with central staircase and black lantern, connected to a keeper's dwelling, gray with red gable. The tower is 52 feet high from its base. The light, which was established in 1900, is used as a guide through the Mona Passage. The photograph shown herewith was taken from near by. The lamp, reservoir, and oil pump were repaired; the windows were glazed; locks were repaired; a flagstaff was erected on the dwelling; the cistern was repaired; material for a second house was stored; and the grounds about dwelling were graded.

1158. Cape Rojo, Caribbean Sea, on the southwesterly point of Porto Rico.—This light is of the third order, flashes white every minute, is 121 feet above high water, is visible 18 miles, and is shown from an hexagonal dark-gray tower attached to a one-story flat-roofed gray dwelling, which has green blinds and white trimmings. The tower is 40 feet high from its base, was commenced in 1878 and was finished in 1882 by the Spanish, at a cost of 14,900 pesos. It is used to guide along the southerly coast of Porto Rico and to the Mona Passage. The lamp and revolving machinery were overhauled and repaired as far as practicable, but they are still in bad condition. The floors and walls were cemented, the plumbing and sewer were overhauled and two bevel-gear wheels for the lens clock were furnished, and the clock work was repaired. In February, 1901, the lamp, which gave out, was replaced temporarily with a regulation type table stand lamp, which is still in position, awaiting a new lamp, which is to be sent from the general light-house depot. A duplicate of the machinery, which has been ordered from France, is expected to arrive quite soon.

1160. Point Jiquero, southerly side of Aguadilla Bay, on the westernmost point of Porto Rico.—This sixth-order fixed white light is 69 feet above high water, can be seen 8 miles, is shown from an octagonal tower in front of the center of a square one-story flat-roofed stone-colored dwelling with red trimmings. The tower is 32 feet high from its base, was commenced in 1891 and finished in 1892 by the Spanish, at a cost of 12,361 pesos. It serves as a guide through the Mona Passage and to the approach to Mayaguez Bay. No repairs were made at this station.

1161. Point Borinquen, Atlantic Ocean, about $3\frac{1}{2}$ miles to the northward of the port of Aguadilla, on the northwestern point of Porto Rico.—This is a fourth-order light, which flashes alternately red and white, with an interval between the flashes of thirty seconds. It is 65 feet above the level of the sea, is visible 12 miles, is shown from an octagonal tower in front of the center of a square one-story flat-roofed dwelling, which is red with white trimmings. The tower is 40 feet

high from its base, was begun in 1888 and was finished in 1889 by the Spanish, at a cost of 30,870 pesos. The lens of the machinery was overhauled and two new bevel-gear wheels for the lens clock were furnished.

The temporary tender.—There being no tender in Porto Rican waters, the schooner *Abbie C. Stubbs* was chartered from August 1, 1900, to January 31, 1901, and arrived at San Juan late in September, 1900, bringing office furniture, lamp-shop machinery, and other supplies. A working party was organized at once, materials were purchased, and the schooner started on October 28, under charge of the superintendent of construction, and made a round of all the Porto Rican light-houses, ending about January 27, 1901, at San Juan. The schooner was then discharged. On this trip minor repairs were made at all the lights except Jiguero and Arecibo, consisting in repairing leaking roofs, pointing masonry, plastering broken patches in walls, ceilings, and floors. Extensive repairs were made at the boat landing at Culebrita and of the outhouses at Mona Island. The lamps and lamp machinery were overhauled.

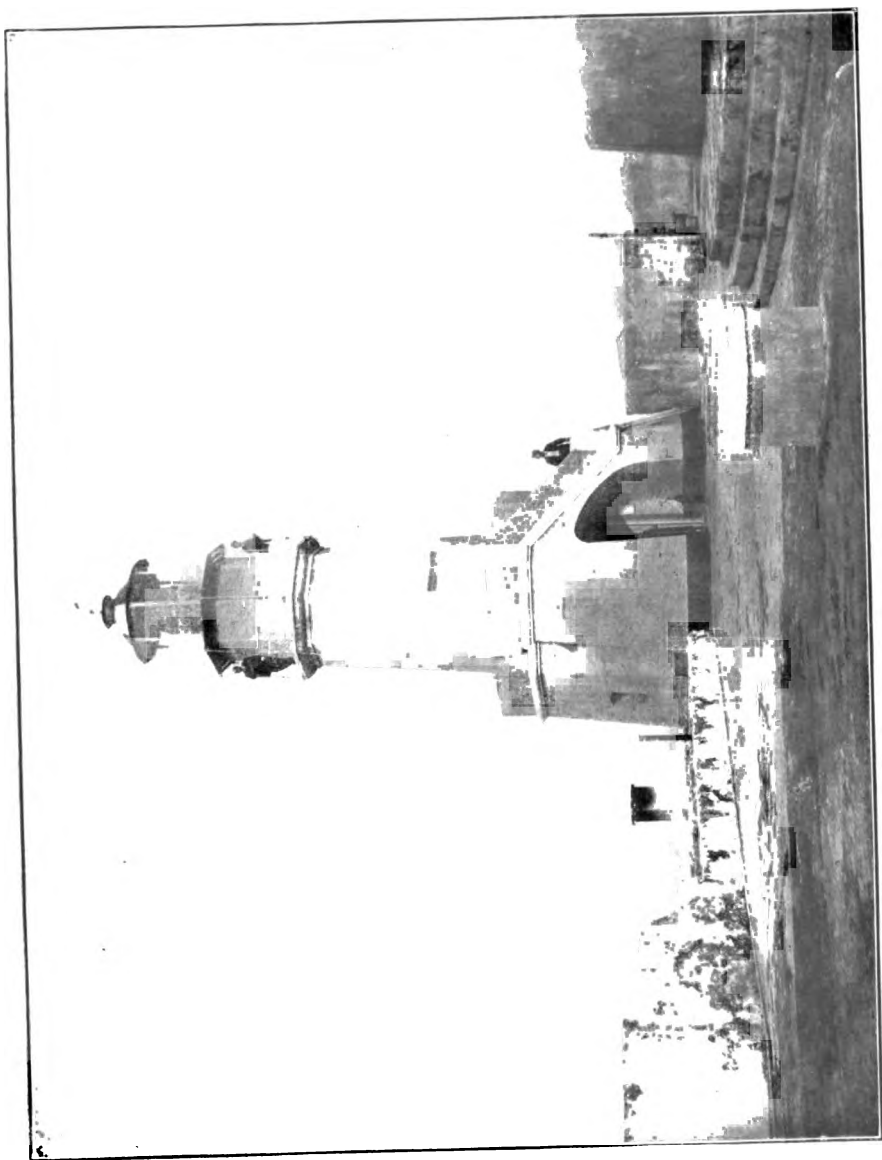
BUOYAGE.

When the investigation of the United States Coast Survey, now in progress, is completed, the buoyage system will necessarily have to be extended, as many dangerous shoals are being discovered. During the past year buoys have been placed in several harbors. On September 25, 1900, a third-class black can buoy was placed in Fajardo Harbor to mark the channel from Cape San Juan into the Playa of Fajardo. On October 10, 1900, the old mooring buoys in Mayaguez Harbor were replaced by first-class iron buoys, and a third-class black can buoy was placed off the entrance of Ponce Harbor to mark Cardona Island Shoal. On December 15, 1900, Jobos Harbor was buoyed. On January 5, 1901, the buoyage system of San Juan Harbor was revised and reestablished. The buoyage system of the island is incomplete, it being practically impossible to set buoys and keep them in order without the service of a tender.

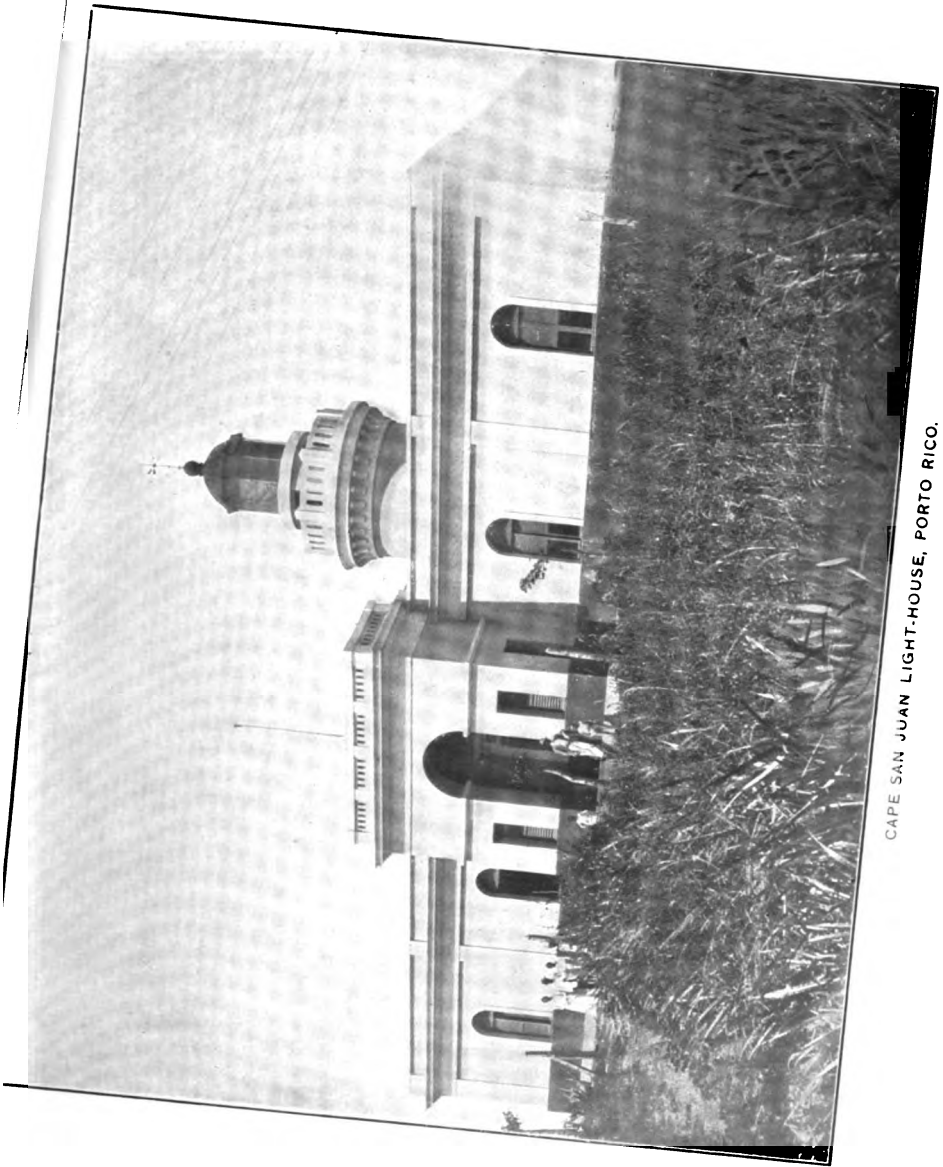
ENGINEER'S OFFICE AT PORTO RICO.

On April 30, 1901, the office of the assistant to the engineer of the Third light-house district and lamp shop at San Juan, P. R., were destroyed by the fire which broke out on the wharf where they were located. All the engineer records except those in the safe were destroyed. Since that date the engineer work has consisted in the reestablishment of the engineer office, making slight changes required by the service, and in fitting up a new lamp shop in a building belonging to the board of public works. New office furniture and most of the material for the lamp shop were sent from the general light-house depot.

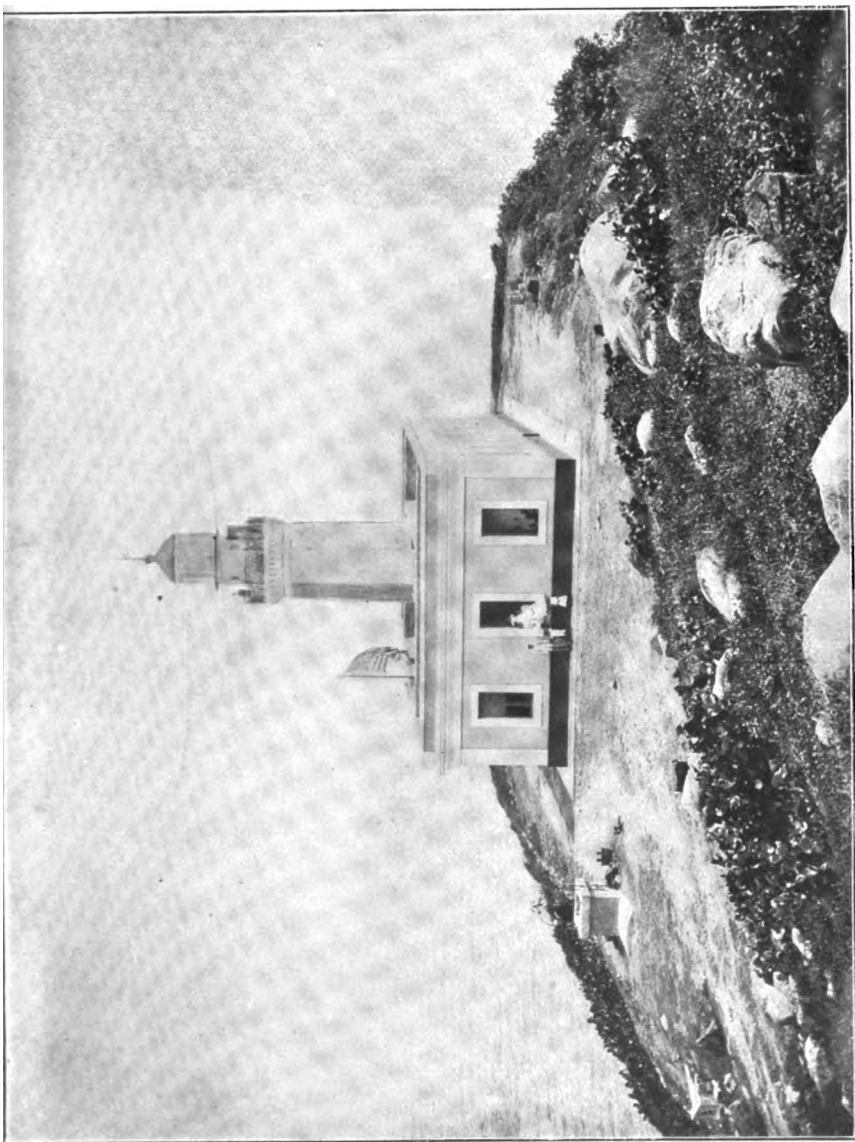
Laurel.—The tender *Laurel* arrived at San Juan on November 28, 1900. While in Porto Rican waters she buoyed the harbors of Jobos, placing 5 buoys, and the harbor of San Juan, placing 16 buoys, which exhausted the stock of buoys on hand. She left San Juan January 8, 1901, with the light-house district officers, on an inspection and sup-



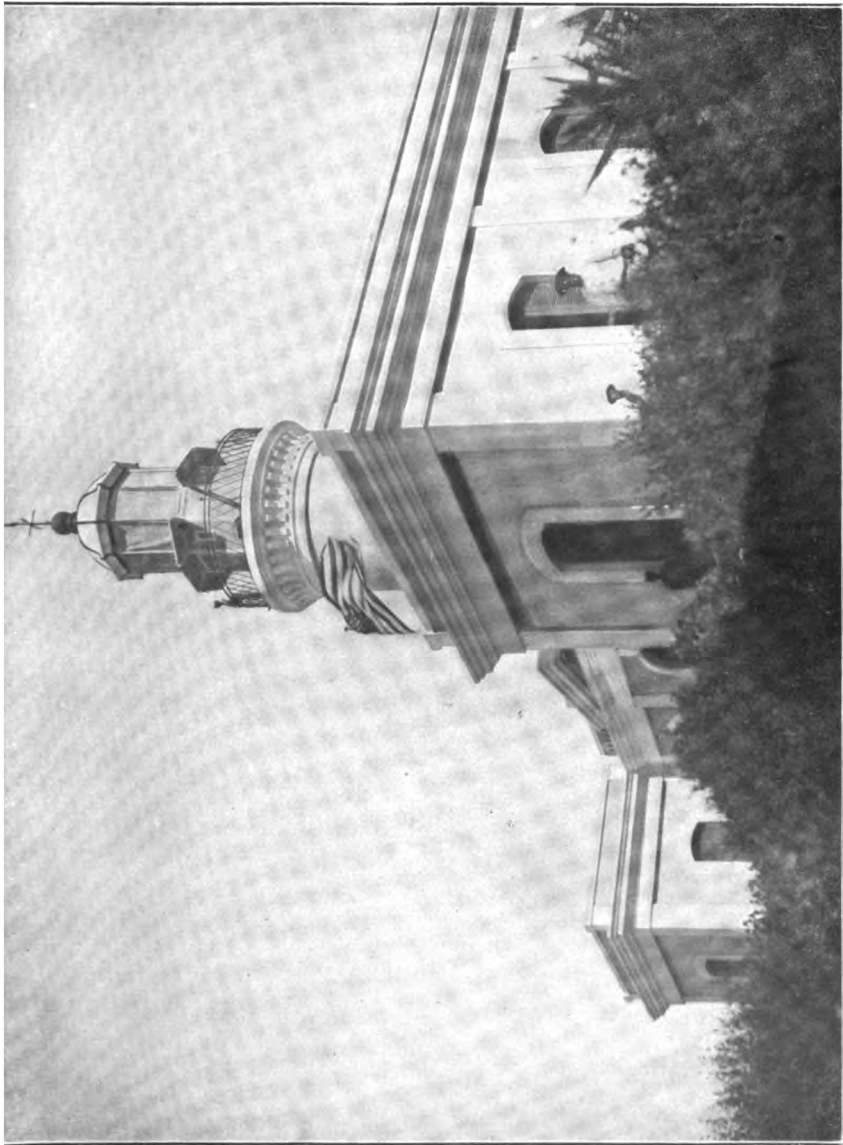
PORT SAN JUAN LIGHT-HOUSE, PORTO RICO.



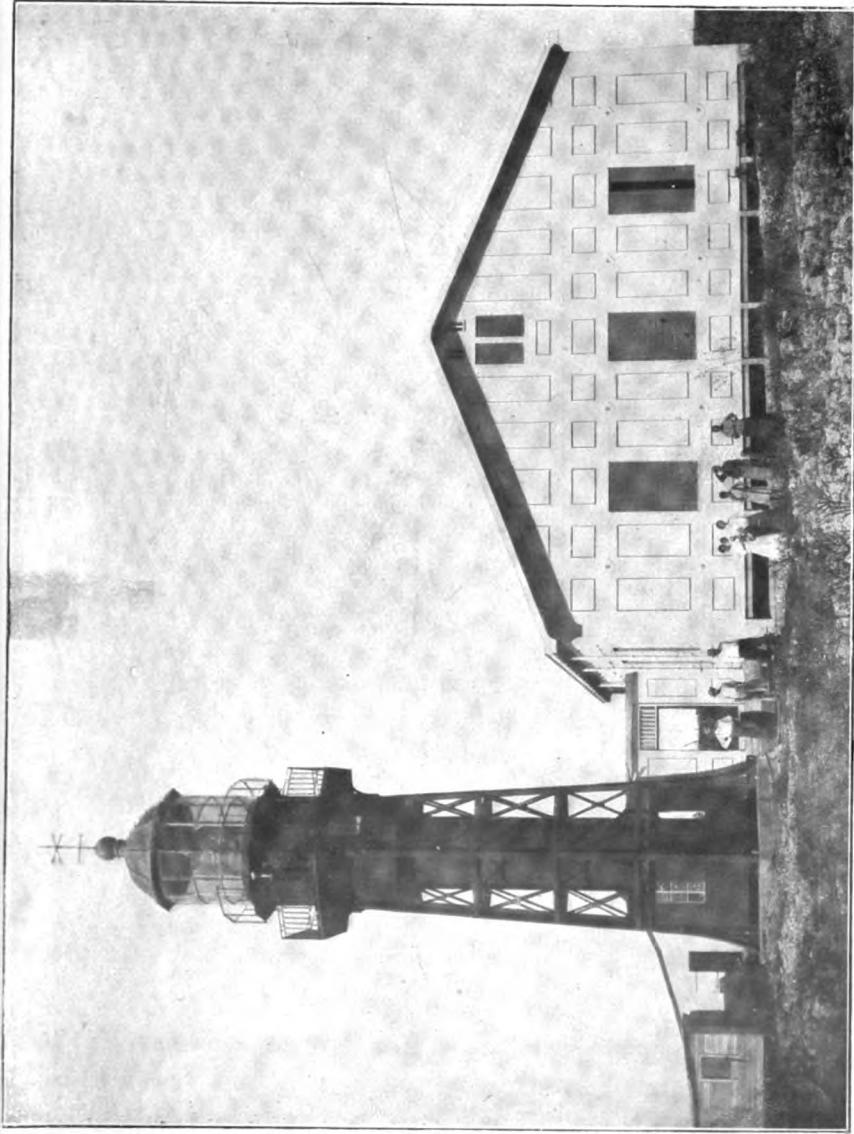
CAPE SAN JUAN LIGHT-HOUSE, PORTO RICO.



POINT TUNA LIGHT-HOUSE, PORTO RICO.



MUERTOS ISLAND LIGHT-HOUSE. PORTO RICO.



MONA ISLAND LIGHT-HOUSE, PORTO RICO.

ply trip to the light-stations. Upon her return, and after attending to a few of the most pressing cases of buoyage, she sailed for Key West March 1, 1901.

LIGHT-VESELS.

187. *Brenton Reef light-vessel, No. 39, entrance to Narragansett Bay, Rhode Island.*—This wooden vessel was built in 1875. She is of 387 tons gross burden, and has a steam fog-signal. No repairs were made to her during the year, and none are needed at present. She received lamps, cooking utensils, medicines, and engineers' stores.

198. *Hog Island Shoal light-vessel, No. 12, Narragansett Bay, Rhode Island.*—This wooden vessel was built in 1846, is of 150 tons gross burden, and has a bell fog-signal. She is too old and worn for permanent service. The light-house which is to replace her will be completed this season, when this light-vessel will be taken to the New London depot and kept there for final disposition. She received during the year medicines, fixtures for galley stove, and table ware.

228. *Ram Island Reef light-vessel, No. 23, Fishers Island Sound, New York.*—This wooden vessel was built in 1857, is of 186 tons gross burden, and has a bell fog-signal. She was brought in for repairs April 30, 1901, and replaced by relief light-vessel No. 20, which is still in her place. She received new masts, booms, gaffs, hawse-pipe, bulwarks, and one trysail mast, and metal sheathing around the bow. On December 21, 1900, the sloop *Lizzie A.* went on the Middle Clump rocks, in Fishers Island Sound, and her crew of three men were taken off and cared for by the crew of the light-vessel. She received during the year new parts for galley stove, cooking utensils, and paints.

250. *Bartlett Reef light-vessel, No. 13, off New London, Long Island Sound, Connecticut.*—This wooden vessel was built in 1854, is of 155 tons gross burden, and has a bell fog-signal. She received during the year fixtures for galley stove, medicines, and flags.

298. *Cornfield Point light-vessel, No. 48, off the mouth of the Connecticut River, Long Island Sound, Connecticut.*—This composite light-vessel was built in 1890-91, is of 295 tons gross burden, has a steam whistle fog-signal, a flashing white light shown from revolving lanterns on the foremast, and a light shown from the mainmast, which is fixed red. She was brought in for repairs on April 5, 1900, and was replaced on her station on August 8, when light-vessel No. 20 was withdrawn. On November 9, 1900, she dragged her moorings 2 miles to the eastward of her station, and on November 11, 1900, was replaced on her station by the tender *Cactus*. On May 30, 1901, she was run into by a steamer, when her stem was damaged. A few hours later on May 31 she was fouled again and damaged in the same place by a barge in tow of a tug bound east. Light-vessel No. 48 was brought in for repairs on June 7 and replaced by relief light-vessel No. 11. She was returned to her station on June 28 and light-vessel No. 11 was withdrawn. She received new tubes and patches to boilers, the connections for the pump were extended to each compartment, the calking was renewed in parts, and her stem and her stern were repaired. The windlass also received slight repairs. This light-vessel received new parts for galley stove, cooking utensils, engineers' stores, and paints. On October 19, 1900, the crew of the schooner *Yosemite*,

which was sunk 5 miles east of the station. were received on board the light-vessel, whence they left for home. On December 24, 1900, the crew of the schooner *Marcus Edwards*, capsized near Falkner Island, were taken from the wreck by a boat from the light-vessel and were transferred on December 27, 1900, to the tender *Cactus* and taken ashore.

357. *Fire Island light-vessel, No. 68, off Fire Island, Atlantic coast of Long Island, New York.*—This steam steel light-vessel was built in 1897, and is of about 589.50 tons displacement. She shows a white incandescent electric light from each masthead. Her fog-signal is a 12-inch steam steel chime whistle. The vessel was brought in for repairs on August 1, 1900, and was returned to her station on November 21, 1900, when relief light-vessel No. 11, which had replaced her, was withdrawn. She received a general overhauling, and is now in good condition. She was furnished with paints, rope, ship chandlery, electric supplies, cooking utensils, fixtures for galley stove, and engineer's stores.

362. *Sandy Hook light-vessel, No. 51, off the entrance to New York Bay.*—This steel steam self-propelling light-vessel was built in 1892, and is of 491 tons displacement. Her light is electric and her fog-signal is a 10-inch steam whistle. The vessel was withdrawn for repairs on September 3, 1900, and returned to her station on October 15, when light-vessel No. 16, which had replaced her, was withdrawn. She was hauled out, cleaned, painted, and received a new main boom. She also received new dynamo engines, and angle irons were put under the fire-room floor.

363. *Scotland light-vessel, No. 7, off Sandy Hook, entrance to New York Bay, New York.*—This wooden light-vessel was built in 1854, is of 142 tons gross burden, and has a bell fog-signal. No repairs were made upon her during the past year. On November 25, 1900, the British schooner *Goldseeker* drifted across the light-vessel's bow, but the damage inflicted was nominal.

— *Relief light-vessel No. 11.*—This wooden vessel was built in 1853, is of 320 tons gross burden, and has a bell fog-signal. On August 1, 1900, she was placed on Fire Island light-vessel station, relieving light-vessel No. 68, which was brought in for repairs. On June 7, 1901, she was placed on Cornfield Point light-vessel station, relieving light-vessel No. 48, which, being damaged by collision, was brought in for repairs. She was taken off on June 28, when light-vessel No. 48 was returned to her station. On June 25, 1901, while on the Cornfield Point light-vessel station, she was fouled by a barge. Her port boat was partly stove, but the light-vessel herself sustained no damage. On June 30, 1901, light-vessel No. 11 was sent for temporary service to the Fourth light-house district.

— *Relief light-vessel No. 16.*—This wooden vessel was built in 1854, is of 250 tons gross burden, and has a steam fog-signal. She is kept at the general light-house depot ready to relieve, in case of emergency, either light-vessel No. 51, stationed off Sandy Hook, or light-vessel No. 68, stationed off Fire Island. On September 3, 1900, she relieved the Sandy Hook light-vessel, No. 51, which was brought in for repair, and was withdrawn October 15, 1900, when light-vessel No. 51 was replaced on her station.

— *Relief light-vessel No. 19.*—Under the authority of the Department this wooden vessel was stripped of everything useful to the

Light-House Establishment, including spars and moorings, etc., and was then turned over to the Navy Department, October 31, 1900.

— *Relief light-vessel No. 20.*—This wooden vessel was built in 1867, is of 105 tons gross burden, old measurement, and has a bell fog-signal. She is kept at the New London, Conn., light-house depot to relieve light-vessels in Long Island Sound. She was on duty at Cornfield Point, Connecticut, station from April 5 to August 8, 1900, and was placed on the Ram Island Reef, Rhode Island, light-vessel station on April 30, 1901.

DAY OR UNLIGHTED BEACONS.

All the day beacons in the district were painted during the year.

FOG-SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

187. *Brenton Reef light-vessel, No. 39, Rhode Island.*—The two steam whistles, 6-inch and 12-inch, were in operation about 425 hours and consumed some 86 tons of coal.

188. *Beavertail, Rhode Island.*—This second-class siren, in duplicate, operated by oil engines and compressed air, was in operation about 390 hours and consumed some 1,156 gallons of oil.

206. *Conanicut Island, Rhode Island.*—This blower siren, worked by a 2½-horsepower oil engine, was in operation about 336 hours and consumed some 116 gallons of oil.

208. *Warwick, Rhode Island.*—This blower siren, worked by a 2½-horsepower oil engine, was in operation about 336 hours and consumed some 86 gallons of oil. The characteristic was changed June 15, 1901.

213. *Pomham Rocks, Rhode Island.*—This blower siren, worked by a 2½-horsepower oil engine, was in operation about 79 hours and consumed some 20 gallons of oil. The characteristic was changed June 15, 1901.

216. *Point Judith, Rhode Island.*—This first-class steam siren, in duplicate, was in operation about 493 hours and consumed some 57 tons of coal.

220. *Block Island (S.E.), Rhode Island.*—This first-class steam siren, in duplicate, was in operation about 725 hours and consumed some 44 tons of coal.

221. *Great Salt Pond Breakwater (outer end) beacon, Rhode Island.*—The blower siren, worked by a 2½-horsepower oil engine, was discontinued pending repairs to the breakwater.

224. *Montauk Point, New York.*—This first-class siren, in duplicate, operated by 10-horsepower oil engines and compressed air, was in operation about 470 hours and consumed some 685 gallons of oil.

231. *New London, Connecticut.*—This first-class Daboll trumpet, worked by a 3½-horsepower oil engine, in duplicate, was in operation about 543 hours and consumed some 310 gallons of oil.

251. *Race Rock, New York.*—This second-class siren, worked by a 7½-horsepower oil engine and compressed air, was in operation about 509 hours and consumed some 364 gallons of oil.

252. *Little Gull Island, New York.*—This second-class automatic siren, in duplicate, worked by a 13-horsepower oil engine and com-

pressed air, was in operation about 561 hours and consumed some 980 gallons of oil. The characteristic was changed December 25, 1900.

255. *Orient Point, New York.*—This blower siren, worked by a 2½-horsepower oil engine, in duplicate, was in operation about 426 hours and consumed some 113 gallons of oil.

298. *Cornfield Point light-vessel, No. 48, Connecticut.*—This 12-inch steam whistle was in operation about 502 hours and consumed some 125 tons of coal.

301. *Falkner Island, Connecticut.*—This 10-inch steam whistle was in operation about 330 hours and consumed some 34 tons of coal.

303. *Southwest Ledge, Connecticut.*—This second-class Daboll trumpet, worked by 3½-horsepower oil engines, in duplicate, was in operation about 243 hours and consumed 131 gallons of oil.

306. *New Haven Outer Breakwater, Connecticut.*—This second-class automatic siren, in duplicate, worked by 13-horsepower oil engines, was in operation about 236 hours and consumed some 406 gallons of oil.

311. *Stratford Shoal, New York.*—This second-class Daboll trumpet, worked by 3½-horsepower oil engines, in duplicate, was in operation about 356 hours and consumed some 160 gallons of oil. The bell was permanently discontinued on November 24, 1900.

318. *Penfield Reef, Connecticut.*—This second-class Daboll trumpet, worked by 3½-horsepower oil engines, in duplicate, was in operation about 260 hours and consumed some 123 gallons of oil.

327. *Eatons Neck, New York.*—This second-class steam siren, in duplicate, was in operation about 439 hours and consumed some 32 tons of coal.

333. *Great Captain Island, New York.*—This 10-inch steam whistle, in duplicate, with Crosby automatic signal, was in operation about 245 hours, and consumed some 36 tons of coal.

338. *Execution Rocks, New York.*—This first-class automatic steam siren, in duplicate, was in operation about 222 hours and consumed some 41 tons of coal.

357. *Fire Island light-vessel, No. 68, New York.*—This 12-inch steam chime whistle was in operation about 403 hours and consumed some 67 tons of coal.

362. *Sandy Hook light-vessel, No. 51, New York.*—This 12-inch steam whistle was in operation about 478 hours and consumed some 129 tons of coal.

377. *North Hook beacon, Sandy Hook, New Jersey.*—This first-class automatic steam siren, in duplicate, was in operation about 701 hours and consumed some 54 tons of coal.

385. *Old Orchard Shoal, New York.*—This blower siren, worked by a 2½-horsepower oil engine, was in operation about 731 hours, and consumed some 299 gallons of oil.

387. *West Bank, New York.*—This blower siren, established June 1, 1901, worked by a 2-horsepower oil engine, was in operation about 33 hours, and consumed some 10 gallons of oil.

397. *Robbins Reef, New York Harbor.*—This blower siren, worked by a 3½-horsepower oil engine, was in operation about 275 hours and consumed some 135 gallons of oil.

399. *Governors Island, New York.*—This blower siren, established November 12, 1900, worked by a 2½-horsepower oil engine, was in operation about 47 hours and consumed some 6 gallons of oil. In case

the siren should be disabled, the bell will sound a double blow every 20 seconds.

BUOYAGE.

The weather during the winter of 1900-1901 was for the most part mild. It was comparatively severe from February to April, but, except in the rivers of the district, navigation was not closed nor seriously impeded by running ice. The loss of buoys and appendages was, therefore, inconsiderable. Aids to navigation were carried away, but were recovered by the tenders, which during periods of moving ice are kept constantly on patrol. The usual removal for the winter of the iron buoys throughout the district, except New York Bay and Harbor, was commenced on November 7, 1900. The removal, on account of ice, of iron buoys in New York Bay and Harbor was commenced on February 6 and concluded on February 12, 1901. At nine of the most important stations, on the port-hand side of the main channel, were placed black steel channel winter buoys, which show as can buoys of the second class. This was the second season of their utilization, and the reports as to their visibility and immunity from accident and displacement by running ice continue to be favorable. The iron buoys taken up during the winter were returned to their stations. The work was commenced about the middle of March. Some 49 new buoys were placed, and 19, most of which were buoys to mark wrecks, a duty to which much time and service is given by the tenders, were discontinued. Two new channels, Coney Island Dredged Channel, New York, and Bay Ridge Dredged Channel, were opened and marked with buoys. The white buoys to mark the anchorage grounds in New York Harbor are established and maintained by the Light-House Establishment. Four new buoys were placed in Newark Bay, New Jersey.

The buoyage system in Porto Rico, which had been practically discontinued, was reorganized during the year by the establishment of a modern service in the harbors of San Juan, Mayaguez, Ronce, Jobos, and Fajardo.

ELECTRIC-BUOY SYSTEM, GEDNEY CHANNEL, NEW YORK LOWER BAY.

The entire system of lights was extinguished for 22 nights. Single buoys were extinguished by various causes on 23 nights. The longest period of extinguished lights was 14 nights during April, 1901. This was caused by a vessel fouling the cable between the junction box and the shore, an accident which resulted in the destruction of 2,300 feet of cable. It being impossible for the tender to work in the then heavy winds and sea, repairs were delayed 8 days. The principal cause of injury is due to collisions by passing vessels.

The electric-buoy station received new roof, gutters, and leaders to engine house and dwelling, and one engine was brought to the general light-house depot and received extensive repairs. The station, embracing buildings and machinery, is in good condition.

Number of vessels using Gedney Channel, New York Lower Bay, between sunset and sunrise, in the fiscal year 1900-1901.

Fiscal year and month.	Bound in.	Bound out.	Total.
1900.			
July	42	25	67
August	48	26	74
September	59	21	80
October	42	29	71
November	70	52	122
December	62	54	116
1901.			
January	94	63	157
February	64	30	94
March	47	48	95
April	34	22	56
May	30	22	52
June	48	14	62
Total	640	401	1,041
Average per month	53.3	33.4	86.7

Synopsis showing the number of vessels using Gedney Channel at night since the installation of the electric-buoy plant, November 7, 1888.

	Number of vessels.			Average per month.		
	Bound in.	Bound out.	Total.	Bound in.	Bound out.	Total.
1888-89 (seven months)	171	53	224	24.4	7.6	32.0
1889-90	377	192	569	31.4	16.0	47.4
1890-91	470	297	767	39.1	24.7	63.9
1891-92	533	252	785	44.4	21.0	65.4
1892-93 (ten months)	487	215	702	48.7	21.5	70.2
1893-94	648	347	995	54.0	28.9	82.9
1894-95	561	286	847	51.0	26.0	77.0
1895-96	542	238	780	45.1	19.9	65.0
1896-97	541	222	763	45.1	18.5	63.6
1897-98	545	235	780	54.5	23.5	78.0
1898-99 (eleven months)	599	372	971	54.5	33.8	88.3
1899-1900	631	359	990	52.6	29.9	82.5
1900-1901	640	401	1,041	53.3	33.4	86.7

LIGHT-HOUSE DEPOTS.

Tompkinsville, Staten Island, New York.—This is the general light-house depot for the Light-House Establishment, as well as the principal depot for the Third light-house district. Here are assembled and stored the annual supplies for light-houses, light-vessels, and day beacons, and the buoys and appendages for the entire service. These supplies are purchased under contract, according to samples and standards mostly of a peculiar kind, and they are prepared for delivery, by the supply steamer *Armeria*, to the light-stations on the Atlantic and Gulf coasts, and for shipment, as freight, to the light-house districts on the lakes and rivers and on the Pacific coast. The supplies collected here include oils, wicks, chimneys, cleaning materials, tools and implements, ship chandlery, hardware, woodware, cooking utensils, furniture, and engineers' stores. Before being accepted they are inspected and tested, and are kept in stock in quantities to meet the demands of the service as they are needed. Buoys and appendages and chains and anchors of

all kinds are kept here and cared for, ready for shipment. In the shops illuminating and fog-signal apparatus are manufactured or repaired, lenses are assembled and set up, and ironwork, brass work, boats, sails, boxes, and cans are made and repaired.

In the storehouses materials and supplies are kept in readiness for issue. Oils, wicks, chimneys, and general supplies are tested in the lamp shop and the laboratory. The light-vessels and tenders of the light-house district are repaired when practicable by the mechanics employed here. The workmen of all kinds and the crews of the vessels lying at the wharves compose the fire department, which is well organized and equipped. The men are assigned to stations and drilled periodically. The power house, electric plant, fire engines, and connections are in good condition.

In the inspector's department the work done embraces receiving, storing, and shipping supplies, buoys and appendages, light-vessel moorings, ship chandlery, rations, and fuel; loading and unloading the supply vessel and the tenders; testing supplies and stores, and manufacturing and repairing carpenter, joiner, and blacksmith work for buildings, vessels, and boats.

The area of the depot grounds is sufficient for present needs, and the condition of the depot in all its arrangements of roads and sewers and pavements, as well as in the provision of space and facilities for outdoor storage of metal buoys, chains, etc., is ample. The sheltered storage for coal, oil, and wooden buoys is, however, wholly inadequate, the buildings being old and lacking in modern equipment and facilities.

Statement of chain, buoys, and buoy appendages received at and shipped from the general light-house depot (inspector's department) during the fiscal year ending June 30, 1901.

Articles.	Re- ceived.	Shipped.	Total.
Gas buoys	3	2	5
Whistling buoys.....	5	3	8
Bell buoys.....	12	5	17
Can buoys.....	49	59	108
Nun buoys.....	57	55	112
Spar buoys.....	240	20	300
Ballast balls.....	221	16	237
Sinkers, iron and stone.....	261	43	304
Shackles and swivels.....	3,150	1,025	4,175
Shackle keys and rings.....	1,500	100	1,600
Chain, buoy (fathoms).....	3,600	1,135	4,735
Chain, light-vessels (fathoms).....	825	690	1,515
Mushroom anchors.....	15	3	18
Bells for buoys.....	24	2	26
Disks for bell buoys.....	21	17	38
Steel striking balls.....		6	6
Bridle chains for bell buoys.....		8	8
Whistles for whistling buoys.....	10	2	12

Statement of boxes, packages, etc., containing supplies received at and delivered from the general light-house depot, Staten Island (inspector's department), during the fiscal year ending June 30, 1901.

	Boxes.	Bundles.	Barrels and kegs.	Packages and coils.	Cans.	Total.
Received	20,391	2,401	11,817	8,803	80,086	123,498
Delivered	24,154	5,671	11,172	9,374	77,549	127,920
Total.....	44,545	8,072	22,989	18,177	157,635	251,418

Statement of quantity of mineral and lard oils received at and delivered from the general light-house depot, Staten Island (inspector's department), during the fiscal year ending June 30, 1901.

	Received.	Delivered.	Total.
	Gallons.	Gallons.	Gallons.
Mineral oil	440,000	439,575	879,575
Lard oil	1,015	4,248	5,263
Total	441,015	443,823	884,838

The act approved March 3, 1901, appropriated \$25,000 to continue the repairs and improvements to the present buildings and grounds and to erect a new oil house and lamp shop. This is the general depot of the entire Light-House Service, and the work done is extensive, varied in character, and of the highest importance to the maintenance and betterment of the service. The work on the inspector's side embraces the receiving, storing, and shipping of supplies, buoys and appendages, anchors, chains, ship chandlery, rations, and fuel; loading and unloading the supply vessel and tenders; testing oils, paints, chimneys, and stores of different kinds; repairing tenders and light-vessels; making and repairing boats, sails, awnings, etc.; the repairing and, in part, the manufacturing of buoys and fittings of all kinds. On the engineer's side is the importation, inspection, storage, preparation, and, in large part, the manufacture and assembling of illuminating and other light-house appliances, some parts of which are not made or not advantageously procurable in this country; the manufacture and development of lamps and technical apparatus of many kinds, the constant endeavor by test and experiment to improve the efficiency and reduce the cost of illuminating and fog-signal apparatus, the testing of engines and fog-signals and investigation of new illuminants and methods of illumination, and improvements in the design and application of light-house structures and materials; the preparation of plans and specifications for and works of construction; the repairs of stations, fog-signals, etc., and the procurement and shipment of necessary materials therefor.

The following is a statement of the principal work completed or begun at this depot during the year under the engineer of the Third light-house district:

The dredging of the depot basin was begun September 4 and completed September 10, 1900.

At the south wharf 16 new iron mooring cleats were furnished and fitted.

For the extension to the office building the ground was broken April 30, and up to June 30, 1901, the foundation walls of both wings were laid up to the level of the ground, concrete footing for partition walls was laid in both cellars, the cellar walls were lined with brick, and the walks around filled to receive concrete. The bids for furnishing the heating plants were opened June 20, 1901.

In addition the general work of the depot, consisting in part of the following named, has been carried on:

The receipt, preparation, care, and shipment of material and stores for the general work of this and the various districts; the repairs and alterations of the steamers, fog-signals, light-vessels and stations, and the machinery and apparatus pertaining thereto; the care and mainte

nance of the quarters, shops, buildings, fences, and grounds of the depot; the manufacture, the examination, and test of illuminating apparatus from and for the various stations and districts, and from abroad; the preparation of new and the repair of old illuminating apparatus, clocks, revolving machinery, lanterns, lamps, burners, and fog-signals for this and the other districts; the manufacture and repair of oil supply cans and boxes; the setting up and testing of improved fog-signals, oil and gas engines, gasoline, acetylene, and other apparatus, and experiments in connection therewith; the preparation of plans, drawings, and estimates for works, and a large quantity of other detail work.

List of boxes, barrels, bundles, cans, packages, etc., exclusive of lens apparatus, received at and delivered from light-house depot (engineer department) from July 1, 1900, to June 30, 1901.

	Boxes.	Barrels.	Bales, bundles, coils, packages, etc.	Kegs.	Cans.	Total.
Received	901	285	16,467	62	95	17,810
Delivered	953	238	3,939	32	41	5,203
Total	1,854	523	20,406	94	136	23,013

List of lens apparatus, etc., received at and shipped from general light-house depot, Staten Island, New York, by engineer Third light-house district, with number of cases in which received and shipped, from July 1, 1900, to June 30, 1901.

	First order.	Second order.	Third order.	Third and a half order.	Fourth order.	Fifth order.	Lens lanterns, post lanterns, etc.	Range lenses.	Total.
Received					8	2	434	1	445
Delivered	1		3		9	2	430	1	446
Total	1		3		17	4	864	2	891
Number of cases:									
Received					9	2	864	5	880
Delivered	37		52		21	7	864	3	984
Total	37		52		30	9	1,728	8	1,864

List of articles manufactured and repaired in the lamp shop at the general light-house depot, Staten Island, New York, under the direction of the engineer Third light-house district, during the year ending June 30, 1901.

	Lenses.	Lens lanterns.	Post lanterns.	Lamps.	Burners.	Miscellaneous articles.	Oil cans.	Total.
Manufactured	7	92	153	463	528	2,721	20,000	23,964
Repaired	11	18	47	79	52	1,633	5,000	6,840
Total	18	110	200	542	580	4,354	25,000	30,804

The following recommendation, which was made in the Board's last annual report, is renewed:

The work of this and other light-house districts is constantly and rapidly increasing, both in volume and variety, to such an extent as to outstrip the facilities for production, and the result is that the orders exceed the capacity of the shops.

To meet the present and growing demands of the service in an economical and satisfactory manner, additional shop, storage room, and other facilities, urgently needed and here named in the order of their relative importance, are earnestly recommended:

New oil house, estimated cost	\$40,000
New coal shed, estimated cost	20,000

At present there is one brick oil house; its capacity is insufficient for the storage of the oil, consequently the excess has to be stored in the adjacent coal shed, an old frame structure; the other coal shed, of a capacity of about 300 tons, has to answer for the needs of the district, thus requiring frequent purchases of coal.

While coal is being delivered to the coal sheds and while it is being placed on the tenders the delivery of oil has to be suspended, and vice versa, on account of the buildings being adjacent and the vessels in each case occupying the dock room, causing delay and expense. If the coal shed is placed on the south dock as proposed, and the new oil house on the site of the present two coal sheds, this difficulty will be overcome.

New lamp shop, estimated cost.....	\$50,000
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The present lamp shop is so crowded with machinery and workmen that it is not practicable to increase the present force, which is inadequate to meet the demands of the service, so it often happens that important and urgent work has to be delayed for lack of facilities to attend to it. The lamp shop is also deficient in storage room, light, and ventilation, and during the winter months the men can not see to work properly. If a new lamp shop is built the old one would afford excellent and ample storage room for the heavy lenses and other costly apparatus and material, some of which is now stored in the old storehouse, subject to danger from fire.

There are now no sufficient means of properly testing lens apparatus, and make-shifts must be employed. It is proposed to place a tower on the east end of the new lamp shop, in which the lenses can be tested and the effect seen from the sea.

Light-house inspector's carpenter shop and boathouse, estimated cost.....	\$6,000
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This building is a frame structure and should be torn down and replaced by a brick building for security against fire; the present carpenter shop should then be taken down.

Blacksmith shop, removal of, estimated cost	\$1,000
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This shop is in charge of the light-house inspector and is mostly used for repairs to buoys. It should be removed to the site now occupied by the light-house inspector's carpenter shop, where it would be more conveniently situated for handling buoys, etc., which are now landed and stored at that place, where most of the smith's work is done.

Buoy shed on north wharf, estimated cost.....	\$3,000
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The proposed shed is to be covered with corrugated iron on the north and left open on the south side. Its purpose is to provide a place where buoys may be repaired and painted in any weather, and for storage of material.

Watch house, lower gate, estimated cost	\$2,500
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This is a frame building on brick foundation. It is proposed to replace the frame with a brick structure.

Watch house, upper gate, estimated cost.....	\$1,200
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This also is a wooden structure. It should be replaced with a brick one.

Under annual appropriations the work of improvement of this important depot has been in progress for a number of years. The completion of this work is estimated at \$123,700, and the Board recommends that the sum of \$60,000 be appropriated for continuing the work during the next fiscal year.

New London, Connecticut.—This depot is used to supply and serve the eastern section of the district, which is embraced between New Haven and Providence. Some of the annual and most of the incidental supplies are stored here. The stock kept on hand includes buoys and appendages, lime, fuel, anchors, and light-vessel chain. The tender *Cactus*, stationed at this depot, is charged especially with the duty of supplying the light-stations and attending to the buoys and beacons eastward of New Haven, but in cases of emergency she is called to the

general depot for duty in the western section, and for like service the other tenders are sent east. Relief light-vessel No. 20 is held here, in readiness for service at short notice.

Goat Island, Newport Harbor, Rhode Island.—Fuel and lime for the stations in Narragansett Bay and vicinity, and anchors and chain and buoys and appendages required for the floating aids to navigation are supplied from this light-house depot. The light-house tenders working in the vicinity receive here their supplies of fuel.

Juniper Island, Lake Champlain, Vermont.—This light-house depot is for the light-house service on Lake Champlain. It consists of a small storehouse for boats, building materials, and supplies. The wharf is commodious and serves for landing at the light-station and for storing buoys.

SUPPLY STEAMER.

Armeria.—This steel screw steamer was built in 1889-90 and is of 1,475 tons displacement. During the past year she made, as usual, three voyages, delivering the annual supplies. The first embraced all the light-stations between St. Croix River, Maine, and Robbins Reef, New York; the second, the stations from Cape Lookout, North Carolina, to Point Isabel, Texas; and the third, the stations from Portsmouth, Va., to Fire Island, New York, including those in Chesapeake and Delaware Bays and Hudson River.

She was hauled out on dry dock once during the year and scraped and painted. She received a new propeller and a worm for her windlass. Her engines were overhauled and her boilers were repaired. Her alco-vapor launch was also repaired. In a storm in the Gulf during her winter trip a cargo boat was wrenched from the davits and lost. It was subsequently picked up in a wrecked condition by a passing vessel and delivered to the light-house depot at Key West, Fla. The hull and engines are generally in good condition. The boilers are 11 years old and in poor condition. The *Armeria* received during the year cooking utensils, engineers' stores, ship chandlery, and tableware. Her duties were thoroughly performed and she is kept in good condition. She delivered 262,315 gallons of mineral oil, 7,401 boxes of chimneys and cleaning materials, 136,333 packages of supplies, and 203 tons of paints, oil, driers, and turpentine. She delivered to the district light-house depots in her route 222 tons of buoys, chain, sinkers, shackles, ballast balls, and anchors, and 1,601 packages of incidental supplies. In the discharge of special duty she changed the sea buoys at St. Augustine and Mosquito (Florida) inlets and the whistling and other buoys off Cape Canaveral, Florida. In doing this work the *Armeria* steamed about 16,200 miles and consumed some 1,402 tons of coal.

LIGHT-HOUSE TENDERS.

John Rodgers.—This iron side-wheel steamer was built in 1883 and is of 260 tons gross burden. Her employment was constant, except for 21 days, at intervals, when she was laid up for repairs, made with the force and materials at the depot. She established 8 new buoys, recovered 4, and changed or replaced 343 buoys. Her buoy service embraced changing 13 electric buoys and repairing the cables of the

electric-buoy system 12 times, as well as special trips to attend to gas and bell buoys, and she located and marked 10 wrecks. She visited 116 stations on tours of inspection, towed and changed light-vessels, made changes in electric connections at Statue of Liberty light-station, delivered in the district 4,105 gallons of mineral oil, 781 tons of coal, some 4 cords of wood, 826 packages of supplies, and 11 lots of rations; made 10 shipments of freight to transportation lines, and replenished, as required, the stock of buoys and appendages at the New London light-house depot. She was employed at the general light-house depot 75 days preparing shipments, cleaning and painting buoys, filling coal, fitting out light-vessels for service, and stowing buoys and chain in the yard. In doing her work she steamed about 8,405 miles and consumed some 665 tons of coal. The vessel performs her inshore and harbor work well and is kept in good order.

Cactus.—This wooden side-wheel steamer was purchased in 1865. She is of about 200 tons burden. During the year she delivered 2,645 gallons of oil, 766 tons of coal, 64 cords of wood, and 54 allowances of rations. With her, periodical inspections were made of 31 stations. She was engaged 18 days in attending light-vessels, 79 in delivering supplies, 5 in moving keepers, 61 on buoy service, and 58 days at the depot cleaning and painting buoys. The *Cactus* replaced or changed 271 buoys, placed 6 new ones, recovered 11, and painted 254 buoys. In doing this work she steamed about 10,884 miles and consumed some 520 tons of coal. A steel boiler was put in the *Cactus*, for which she was laid up 52 days. She received during the year ship chandlery, hardware, table ware, cooking utensils, galley furniture, and engineers' stores.

Gardenia.—This wooden screw steamer, purchased in 1888, is of 150 tons gross burden. She was 18 days on tours of inspection, and delivered 421 tons of coal, 13½ cords of wood, rations to 10 stations, and 949 packages of supplies. She transferred keepers, delivered coal, took part in fire drills, stowed buoys and appendages, and otherwise helped, as required, in the work of the yard, changed light-vessels, prepared light-vessels for service, recovered buoys from the beach, and marked three wrecks. In this service she steamed about 7,233 miles, and consumed some 427 tons of coal. She was hauled out on the ways and her hull, boiler, and engine received extensive repairs during 45 days. The hull and the engine of the *Gardenia* are 22 years old; her boiler is 9 years old. Her beams work considerably in a sea way. She received hardware, bedding, cooking utensils, medicines, and engineers' stores.

Daisy.—This wooden screw steamer was purchased in 1892, and is of about 25 tons gross burden. She is handy and well equipped for the light, quick service which she performs. This consists principally in the shipment of freight, transportation and delivery of annual supplies to stations on Lake Champlain and incidental supplies in small quantities elsewhere in the district, tours of inspection, patrol duty, and marking wrecks. In view of her service, the hull, engine, and boiler are in good condition. The old water tanks for the use of the boiler were removed and new ones installed by the depot force. New rails were put in, and the cabin was repaired. She delivered 13,255 gallons of mineral oil, 950 packages of supplies, made 145 inspections, cleaned and painted 90 buoys, assisted for 47 days in work at the general light-house depot, attended gas buoys, and supplied the light-houses

on Lake Champlain. She was laid up 23 days for repairs. The *Daisy* steamed about 3,200 miles, and consumed some 122 tons of coal. She received cooking utensils, crockery, and engineers' stores.

Larkspur, tender for the inspector, Third light-house district.—The act approved March 3, 1901, appropriated \$62,500 for her completion. The building of this tender was contracted for on April 1, 1901, the steamer to be finished by April 5, 1902. She is to be a twin-screw steel steamer, to be used for ocean as well as inside work. The length over all will be 169 feet and 2 inches. The length of her water line will be 162 feet and her beam, molded, 30 feet. The depth of hold from the top of the main-deck beam to the top of the keel amidships will be 14 feet. The vessel will have 5 main water-tight bulkheads and 1 water-tight flat at the forward end, forming a trimming tank. Large bilge keels will be fitted for about 65 feet on the length of the ship. All the material will be open-hearth mild steel. The vessel will be fitted with two vertical, inverted, direct-acting, open-front, surface-condensing, fore-and-aft compound engines, with cylinders 19 inches and 36 inches in diameter and a stroke of 28 inches, driving right and left handed, 4-blade cast-iron propellers of the solid type. The surface condenser will contain about 821 square feet of cooling surface in each condenser, the condenser for each engine being independent of the other. There will be two main boilers of the gunboat type, 9 feet and 7½ inches in diameter and 18 feet 6 inches long, constructed for a steam-working pressure of 120 pounds per square inch. The vessel will have accommodations for the light-house inspector, for members of the Light-House Board, and for the officers and crew, with bathrooms and sanitary accommodations for all. She will be fitted with a steam steering engine, steam anchor windlass, steam heating, pilot house, chart house, ice room, and the like. She will be rigged as a two-masted schooner, with gaffs, but without yards. She will have a derrick boom for handling buoys, etc., fitted on the forward mast, the derrick boom being operated by a powerful double-cylinder steam winch. The tender is to have a sea speed of about 12 knots, but will have sufficient power to increase this speed to about 13½ knots.

Iris.—This steel screw steamer was built in 1897 and purchased by the Board. She is of 428 tons gross burden. The following-named repairs were made: The high-pressure cylinder was bored out and fitted with a set of high-pressure sectional packing; a set of new grate bars, a new wildcat for the windlass, 3 bridge walls in the furnace, and 2 brass piston rods for fire pump were fitted; the hull was scraped from keel to water line and painted; new lignum-vitæ bearings were fitted on the sleeve of the main shaft; the shaft was replaced and lined up; a new propeller wheel was fitted to the shaft; 20 feet of damaged guard rail was renewed and the remainder was widened; 3 crank-pin brasses, 6 main bearings, 2 spring bearings, and 3 crossheads were rebabbitted, and the engine was lined up. The shoulder in the top of the bore of cylinder was removed; the valves of all the main cylinders were reset; the reversing links were overhauled; the air connecting rod brasses were trued up; the throttle valves were overhauled; a broken spring in the relief valve was replaced; a leak was stopped in the flange joint between the high and intermediate pressure cylinders; coupling-bolt holes were reamed out and fitted with new bolts in the coupling of the crank shafts.

With the exception of the time occupied in these and minor repairs at the depot—painting, overhauling, etc.—this vessel was employed in the general work of inspection, construction, repair, and maintenance of the lights, beacons, signals, and other aids and works of the district, in the performance of which duties she steamed 956 hours and about 9,740 miles, with a consumption of some 512 tons of coal, being an average of 1,191 pounds for each hour of steaming.

Mistletoe.—This wooden side-wheel steamer, of 332 tons net burden, was built in 1872, is still in excellent condition, and is a valuable aid in the general work of the district. Only minor repairs by her crew and the depot force were made. With the exception of the time occupied in cleaning, painting, general overhauling, etc., she has been continuously employed in her usual work of inspection, construction, repairs, and maintenance of lights, signals, beacons, and other aids, the freighting and shipment of stores, materials, supplies, apparatus, etc., in the performance of which duties she steamed 616 hours and about 5,815 miles, with a consumption of some 293 tons of coal, being an average of 1,068 pounds for each hour of steaming.

— *Tender for Porto Rican waters*.—Efforts have been made to carry on the light-house service in Porto Rican waters with the aid of steamers borrowed from the Navy and from other light-house districts, with but poor success. It is now evident that it is necessary to provide for this service a staunch seagoing steamer, drawing about 11 feet of water, of about 175 feet in length, with good beam, heavily engined, calculated to freight all of the light-house material needed from the mainland to the island and to distribute it to the light-houses on the 400 miles of Porto Rican coast, carrying to and fro inspection, supply, and repair parties, with proper material, and to carry, set, and care for the buoys required on the Porto Rican coast. The one steamer could do the work of maintenance, supply, and buoyage under the light-house inspector, and that of construction and repair under the light-house engineer.

The assistant to the inspector of the Third light-house district in charge of the Porto Rican light-house service wrote to the inspector of the Third light-house district on February 14, 1901, as follows:

Considering the distance between good harbors about the island and the constant trade winds that beat against the shores, making all the running on the high seas; the isolation of some of the stations and the difficulty of supplying them or communicating with them, it is seen that the services of a seagoing tender are needed at all times. * * * The buoyage system, when completed, will also require a tender to keep the buoys painted, as the birds will make all colors white in a short time.

This officer, in his letter of March 23, 1901, in answer to a query as to whether the tender *Laurel*, then stationed in the Seventh light-house district, with headquarters at Key West, Fla., would be a suitable tender for this district, replied:

Most of the stations are miles away from any good anchorage, and when buoys are placed off the eastern and western ends of the island they will be in exposed waters and may need the services of a tender at any time. To work in moderately rough weather and to reach the isolated stations when a landing can be made, and to make quickly, if necessary, the nearest anchorage, it is thought that only a seagoing tender of a strong, modern type, capable of a speed of 12 knots, good beam, from 150 to 175 feet in length, with not more than 12 feet draft, twin screws for quick handling, accommodations and modern improvements adapted to this climate, will sufficiently meet the requirements of this subdistrict.

It is estimated that such a steamer can be built for not exceeding \$125,000. The Board now recommends that this sum be appropriated therefor, and that it may be made immediately available, as the steamer is needed now, and expensive, unsatisfactory makeshifts will have to be used until a proper steamer is constructed.

Steam launch Nettle.—This wooden screw steam launch was built in 1878, and is of 18 tons net burden. A boiler and tanks and an air and boiler feed pump were furnished and fitted; the boiler was covered, and the following-named repairs were made: The crank shaft was strengthened; new crank pin brasses were fitted; the engine was lined up; the condenser was overhauled and tested; the stern bearings were removed, rebushed with lignum-vitæ, and refitted; 2 composition bolts and 2 lag screws were fitted in the rudder post to replace old iron ones, and the propeller was refastened. She was generally overhauled and refitted, and is now in good condition. With the exception of the time occupied in these repairs, etc., she was employed in the general work of repairs, inspection, and maintenance of lights, signals, etc., in New York Bay and adjacent waters, and in Long Island Sound as far east as New London, at points and in places where a larger vessel could neither economically nor advantageously be employed, and in the receipt and shipment of freight, stores, apparatus, etc., for this and other districts. In the performance of these duties she steamed some 375 hours and 2,402 miles, with a consumption of about 63 tons of coal, being an average of 376.3 pounds for each hour of steaming.

FOURTH DISTRICT.

This district extends from a point on the coast of New Jersey opposite Shrewsbury Rocks (but does not include the rocks) to and including Metomkin Inlet, Virginia. It embraces all aids to navigation on the seacoast of New Jersey, Delaware, Maryland, and Virginia, and tidal waters tributary to the sea between the rocks and the inlet.

Inspector.—Commander Adolph Marix, United States Navy, March 1, 1901; Lieut. Commander (now Commander) John Hubbard, United States Navy, from March 1, 1901.

Engineer.—Lieut. Col. William A. Jones, Corps of Engineers, United States Army.

In this district there are—

Light-houses and beacon lights, including 5 post lights.....	
Light-vessels in position.....	
Day or unlighted beacons.....	
Fog-signals operated by steam, caloric, or oil engines.....	
Fog-signals operated by clockwork.....	
Gas-lighted buoys in position.....	
Whistling buoys in position.....	
Bell buoys in position.....	
Ice buoys in position.....	
Other buoys in position.....	
Steamer <i>Zizania</i> , buoy tender, and for supply and inspection.....	
Naphtha launch <i>Leal</i> , used for works of construction and repair.....	

Some 261 inspections of vessels, stations, and post lights were made during the year, and without exception the stations were found to be in an efficient condition and the keepers generally attentive to their duties. Frequent inspections of the buoys were made.

LIGHT-STATIONS.

468. *Absecon, Atlantic City, seacoast of New Jersey*.—Improvements to the grounds were made in part by contract and in part by informal agreement after due advertisement. Various repairs were made.

470. *Hereford Inlet, seacoast of New Jersey*.—A contract was made for repairs to the light-house.

473. *Cape May, seacoast of New Jersey*.—The lease to the Cape May Delaware Bay and Sewells Point Railroad Company, for a right of way across the reservation, was extended. Various repairs were made.

478. *Delaware Breakwater (rear), Delaware Bay, Delaware*.—A survey of the station was made and a map was plotted. The light-house grounds about the tower, dwelling, and oil house were graded and either sodded or seeded, the road from the highway to the barn was graded and surfaced with gravel, and about 650 square feet of brick walks, with brick-on-end borders, laid between the dwelling and the tower house and barn. About 600 ornamental trees and shrubs were set out. The westerly part of the clump of cedars on the side of the highway opposite the buildings was inclosed with a barbed-wire fence. A barbed-wire fence in front of the dwelling, on the northerly side of the highway, was removed, and a new one, made from the materials of the

picket fence, was put in its place. The easterly reservation fence was reset on the boundary line. The westerly garden fence was rebuilt. Brick retaining walls were built about the front and rear entrance inclines of the barn. Various repairs were made.

— *Harbor of refuge, Delaware Bay, Delaware.*—The act approved June 6, 1900, appropriated \$30,000 for the erection of a light-house and fog-signal on the new breakwater. Plans and specifications for the structures are being prepared pending the completion of the breakwater.

481. *Brandywine Shoal, Delaware Bay, Delaware.*—The new fog-signal house was practically completed. The operating machinery of the fog-signal, with air tanks and connection pipes, was made ready for delivery at the station. Various repairs were made.

487. *Maurice River, Delaware Bay, Delaware.*—An oil house was built.

488-489. *Maurice River range lights, Delaware Bay, New Jersey.*—The oil house was completed. A boat landing was erected. Elevated walks, having pile foundations, were built from the veranda to the boat landing and from the boat landing walk to the front light. The walk in the rear of the dwelling was extended. A resurvey of the bar at the river entrance was made, which showed that the range lights were properly located. Various repairs were made.

491. *Cross Ledge, Delaware Bay, New Jersey.*—The new occulting apparatus of the lens was received, set, adjusted, and tested. Three extra panes of ruby glass were furnished for the red sector of the lantern. A survey of the shoal about the station was made, and a chart plotted, preparatory to strengthening the riprap protection of the light-house. The foundation is an octagonal granite shell of rough-faced, coursed masonry, 40 feet in diameter, resting upon a pile of riprap raised to low water. The granite shell was found to be filled with loose riprap only, and the mortar joints of the wall had washed out in many places below high water. The masonry joints below water were sealed and the contents of the granite structure was solidified. In doing this the joints were cleaned out 2 inches from the surface, filled with mortar to the same mortar-joint structure, and then the whole of the exterior surface of the joints for this depth of 2 inches was calked with lead. The riprap contents of the shell were solidified by the injection of Portland-cement grout. The heavy riprap partly surrounding the site as an ice breaker having been carried away to below high water, plans were prepared for renewing it and at the same time to so place some of the new material as to form a small harbor, where small boats could enter in safety and effect a landing in bad weather. Bids to do the work were invited on February 28, April 4, and June 14, 1901, but none were received.

493. *Mahon River, Delaware Bay, Delaware.*—An appropriation of \$4,000 was made in the deficiency appropriation act approved March 3, 1901, in addition to the amount appropriated in the sundry civil appropriation act approved June 11, 1896, for establishing this station on a new site, and bids for doing the work were called for by readvertisement. Minor repairs were made to the light-house and to the shell road leading across the marsh to the station.

496. *Bombay Hook, Delaware River, Delaware.*—Corrections were made to the map of the station, bringing it up to date.

497, 498. *Port Penn range, Delaware River, Delaware.*—A survey of the shore end of the range was made. Various repairs were made. Congress, by the act approved June 6, 1900, authorized the reestablishment of this and the Reedy Island and Finns Point ranges at a cost not exceeding \$90,000, and by the act approved March 3, 1901, appropriated \$60,000 for this purpose.

The Board now recommends that an appropriation of \$30,000 be made for completing the reestablishment of these ranges.

499, 500. *Reedy Island range, Delaware River, Delaware.*—Both ends of the range were surveyed. Various repairs were made. Congress, by the act approved June 6, 1900, authorized the reestablishment of this and the Port Penn and Finns Point ranges, at a cost not exceeding \$90,000, and by the act approved March 3, 1901, appropriated \$60,000 for this purpose.

The Board now recommends that an appropriation of \$30,000 be made for completing the reestablishment of these ranges.

501. *Sabem Creek, Delaware River, New Jersey.*—The foundation crib of the new tower was filled with stone, its deck and railings were put on; its outside was sheathed with iron, the lantern post was mounted, and a lens lantern and lamp were furnished. The light was displayed from the new structure on August 15, 1900. A contract was made and the foundation piles and other débris of the old tower were removed. Minor repairs were made.

— *Finns Point range, Delaware River, New Jersey.*—Surveys were made on both the New Jersey and Delaware ends of the range, and negotiations were begun for the purchase of a site. A boring was made 70 feet below the bottom of the river at the intersection of the new Finns Point and Port Penn ranges. Minor repairs were made. Congress, by the act approved June 6, 1900, authorized the reestablishment of this and the Port Penn and Reedy Island ranges, at a cost not exceeding \$90,000, and by the act approved March 3, 1901, appropriated \$60,000 for this purpose.

The Board now recommends that an appropriation of \$30,000 be made for completing the reestablishment of these ranges.

505. *New Castle range front, Delaware River, Delaware.*—The tower was repainted a solid white, and the barn, dwelling, and elevated board walk were repainted a light brown. Various repairs were made.

506. *New Castle rear range, Delaware River, Delaware.*—The damaged illuminating apparatus was replaced. The lantern and the front of the lantern tower were repainted a solid black and the remainder of the front of the light-house a solid white. Various repairs were made.

507. *Deep Water Point range (front), Delaware River, New Jersey.*—The front of the lantern was painted a solid black, the remainder of the front of the light-house a solid white, and the barn, boathouse, and oil house a light brown. A new lease was made for the right of way leading to the station. Minor repairs were made.

508. *Deep Water Point range (rear), Delaware River, New Jersey.*—The station was repainted black, and two slatted frames added, one on each side, just underneath the lantern. The plotting of the station map was completed. Minor repairs were made.

— *Christiana south beacon, Delaware River, Delaware.*—Preparations were made for the establishment of a temporary post light on or about July 10, 1901.

509. *Christiana beacon, Delaware River, Delaware.*—On December 29, 1900, the lantern post and lamp house were removed to the terminal crib of the new jetty extension. A survey showing the new location of the post was made and a map plotted. A contract was made for the erection of a new fog-signal house and lantern post. A fog-bell striking machine was purchased. Various repairs were made.

510. *Christiana, Delaware River, Delaware.*—A survey of the boundaries of the reservation was made and a new map of the station compiled. Various repairs were made.

511. *Cherry Island rear range, Delaware River, Delaware.*—The ground about the light-house, oil house, and barn was graded so as to secure proper drainage, and either resodded or seeded with blue grass. About 700 cubic yards of earth were moved in all, and 1,200 square feet of sod was laid. The road was graded and graveled from the entrance to the barn. Brick walks were laid from the front entrance of the light-house to the road, and from the light-house to the oil house. Various repairs were made.

512. *Cherry Island range, front, Delaware River, Delaware.*—Plans and specifications of the tower were made and placed on file. A contract was made for repainting the barn, dwelling, fog-signal, and buoy depot storehouse a light brown. Minor repairs were made.

513. *Grubbs Landing, Delaware River, Delaware.*—The act approved March 3, 1901, appropriated \$8,000 for establishing a beacon light near Grubbs Landing, Delaware. Plans and specifications were prepared and a contract was made for the erection of the foundation crib carrying the lantern post.

515. *Schooner Ledge range, front, Delaware River, Pennsylvania.*—A survey of the station and the right of way along Darby Creek was made and the plotting of a map begun. The front of the day mark, the lantern, the lantern tower, and a vertical strip on the front of the light-house below the tower were painted a solid black, and the remainder of the front of the light-house was painted a solid white. Plans and specifications were prepared and a contract was made for building an elevated walk along the creek bank on the right of way to the station. Various repairs were made.

516. *Schooner Ledge rear range, Delaware River, Pennsylvania.*—The tower was repainted black and two slatted frames were added, one on each side, just underneath the lantern. Brick retaining walls laid in cement mortar, were built about the barn entrance inclines. The road from the boundary to the barn was graded and surfaced with crushed stone. The position of the front entrance gates was changed to correspond to the new location of the road.

517. *Billingsport front, Delaware River, New Jersey.*—Slats were added to the down-river front of the tower, the tower was repainted a solid white, and the barn, dwelling, well house, and elevated board walk were repainted a light brown. Various repairs were made.

518. *Tinicum Island rear, Delaware River, New Jersey.*—The tower was repainted black and a slatted frame added on each side just below the watch room. Various repairs were made.

519. *Fort Mifflin Bar Cut, rear, Delaware River, New Jersey.*—Plans and specifications were prepared and the work of erecting a circular day mark above the lantern on the tower was begun. Minor repairs were made.

REPAIRS.

Repairs more or less extensive were made at the following-named light-stations:

465. Seagirt, seacoast of N. J.	485, 486. St. Jones Creek beacons, Del.
466. Barnegat, seacoast of N. J.	490. Egg Island, Delaware Bay, N. J.
467. Tucker Beach, seacoast of N. J.	494. Ship John Shoal, Delaware Bay, Del.
469. Ludlam Beach, seacoast of N. J.	495. Cohansey, Delaware River, N. J.
476. Delaware Breakwater (east end), Delaware Bay, Del.	521, 522, 523. Horseshoe range (west group), Delaware River, Pa.
477. Delaware Breakwater (front), Delaware Bay, Del.	524, 525, 526. Horseshoe range (east group), Delaware River, N. J.
479. Delaware Breakwater (west end) beacon, Delaware Bay, Del.	527, 528. Schuylkill River range, Schuylkill River, Pa.
482. Fourteen-Foot Bank, Delaware Bay, Del.	537. Assateague, seacoast of Va.
483, 484. Murderkill Creek beacons, Del.	538. Fishing Point beacon, Va.
	539. Killick Shoal, Va.

LIGHT-VESSELS.

471. *Northeast End light-vessel, No. 44, off the seacoast of New Jersey.*—This iron light-vessel was built in 1881-82, is of 30½ tons gross burden, and has a steam fog-signal. She remained on her station during the entire year. Rations, fresh provisions, 39 tons of coal, 2 cords of wood, sails, hose, yellow metal, rope, linoleum for cabin floor, bedding, force pump, paint, an awning for the main deck, blocks, portable forge, etc., were supplied.

472. *Five-Fathom Bank light-vessel, No. 40, off the seacoast of New Jersey.*—This wooden light-vessel was built in 1875, is of 350 tons gross burden, and has a steam fog-signal. She remained on her station during the entire year. Rations, fresh provisions, 40 tons of coal, 2 cords of wood, paint, hose, rope, lime, lantern chains, crockery, sails for vessel and boat, buckets, and grate bars were supplied.

474. *Overfalls light-vessel, No. 46, entrance to Delaware Bay, Delaware.*—This steel light-vessel was built in 1887, is of 337 tons gross burden, and has a steam fog-signal. She remained on her station until March 1, 1901, when she was relieved by light-vessel No. 69. On January 26, 1901, she was damaged by collisions with a barge in tow of a tug. The owners of the vessel proposed to pay bill for repairs. A new smokestack was furnished. Rations, fresh provisions, 38 tons of coal, 2 cords of wood, a new force pump, rope, soda, awning, paint, galley-stove repairs, a small boat, stovepipe, engineer stores, and a copper wire lightning conductor were supplied.

474. *Overfalls light-vessel, No. 69, entrance to Delaware Bay, Delaware.*—This self-propelling, composite, steam light-vessel was built in 1897-98, has a displacement of about 589.50 tons, carries a steam fog-signal, and uses electric lights. She was placed on Overfalls light-vessel station on March 1, 1901, relieving light-vessel No. 46, and continued on the station during the remainder of the year. The characteristic of the lights was changed April 5, 1901, from fixed white to fixed white for 12 seconds, followed by an eclipse of 3 seconds duration. Rations, 176 tons of coal, electrical and engineer supplies, etc., were furnished.

534. *Fenwick Island Shoal light-vessel, No. 52, off the seacoast of Maryland.*—This self-propelling, iron, steam light-vessel was built in

1892, is of 491 tons displacement, and carries a steam fog-signal. She remained on her station during the entire year. Rations, fresh provisions, some 70 tons of coal, 3 cords of wood, sails, galley range and fixtures, rope, blocks, spars for boats, grate bars, tube plugs and bolts, blankets, and engineer supplies were furnished.

536. *Winter Quarter Shoal light-vessel, No. 45, off seacoast of Virginia.*—This steel light-vessel was built in 1887, is of 336 tons gross burden, and has an 8-inch chime fog-whistle operated by compressed air. Two oil-burning engines, each of $3\frac{1}{2}$ horsepower, are utilized to run the compressors. She remained on the station during the entire year. Rations, fresh provisions, 20 tons of coal, 2 cords of wood, lubricating oil, rope, tableware, wire rope, galley-stove repairs, lantern, and chain were supplied.

DAY OR UNLIGHTED BEACONS.

No repairs to the isolated day marks were made during the past fiscal year.

FOG SIGNALS OPERATED BY STEAM, HOT AIR, OR OIL ENGINES.

471. *Northeast End light-vessel, No. 44, New Jersey.*—The 12-inch steam whistle was in operation some 541 hours and consumed about 24 tons of coal.

472. *Five Fathom Bank light-vessel, No. 40, New Jersey.*—The 12-inch steam whistle was in operation some 584 hours and consumed about 25 tons of coal.

474. *Overfalls light-vessel, No. 46, entrance to Delaware Bay, Delaware.*—From July 1, 1900, to March 1, 1901, the 12-inch steam whistle was in operation some 154 hours and consumed about 9 tons of coal.

474. *Overfalls light-vessel, No. 69, entrance to Delaware Bay, Delaware.*—From March 1 to June 30, 1901, the 12-inch steam chime whistle was in operation some 377 hours and consumed about $1\frac{1}{2}$ tons of coal. The bell was in use some $\frac{1}{2}$ hours during repairs to the machinery while getting steam on the main boiler.

476. *Delaware Breakwater, East End, Delaware.*—The second-class Daboll trumpet, operated by an oil-burning engine, was in operation some 469 hours and consumed about 188 gallons of mineral oil.

482. *Fourteen-Foot Bank, Delaware Bay, Delaware.*—The second-class Daboll trumpet, operated by a hot-air engine, was in operation some 355 hours and consumed about 2 tons of coal.

534. *Fennick Island Shoal light-vessel, No. 52, Maryland.*—The 12-inch steam whistle was in operation some 431 hours and consumed about 46 tons of coal.

536. *Winter Quarter Shoal light-vessel, No. 45, Virginia.*—The 8-inch chime whistle, operated by an oil engine, was in operation some 571 hours and consumed about 512 gallons of mineral oil.

481. *Brandypine Shoal, Delaware Bay, Delaware.*—The work of installing a new trumpet fog-signal is in progress.

BUOYAGE.

There were maintained last year on the seacoast from Squan Inlet, New Jersey, to Chincoteague Island, Virginia, 26 buoys; in Barnegat Inlet, New Jersey, 11 buoys; in Little Egg Harbor Inlet, New Jersey,

7 buoys; in Absecon Inlet, New Jersey, 5 buoys; in Great Egg Harbor Inlet and River, New Jersey, 12 buoys; in Townsend Inlet, New Jersey, 3 buoys; in Hereford Inlet, New Jersey, 5 buoys; in Delaware Bay and River and Schuylkill River, 115 buoys; in Chincoteague Inlet, Virginia, 5 buoys; in Metomkin Inlet, Virginia, 3 buoys; in all, 192 buoys. Two buoys were placed in Barnegat Inlet. A black spar was placed to mark the westerly side of the best channel in the vicinity of Reedy Island, Delaware River; a spar was placed to mark a sunken barge in the Delaware River off Gloucester, N. J., and a red spar buoy was placed to mark a shoal spot, with 19 feet of water on it, in Philadelphia Harbor. Three anchorage buoys were discontinued in Philadelphia Harbor, and were replaced by buoys belonging to the municipality, and the spar marking the sunken barge in the Delaware River was discontinued.

GAS-LIGHTED BUOYS.

492. Elbow of Ledge No. 14.—This buoy was in position and continued lighted from July 1 to September 21, 1900, on which date it was reported sunk, probably by collision. A new buoy was placed on the same date, and continued in position until January 8, 1901, when it was removed for the winter season. Later, on the same day, the weather having moderated, the buoy was restored to its position and relighted. On February 9, 1901, the buoy was reported out of position and the light extinguished, but it was restored to its station and relighted at 9.30 p. m. of the same date. It was again dragged from its station on February 11, 1901, and was replaced by a new buoy on February 12, 1901. The light was reported extinguished on May 21, 1901, and on May 22 a new buoy was placed, which continued in position during the remainder of the year. The buoy which was sunk on the station on September 21, 1900, was recovered on October 19, 1900, so badly damaged as to be unavailable for further use.

504. Goose Island Flat, No. 26.—This buoy remained in position from July 1, 1900, to January 8, 1901, when it was removed for the winter season and an iron ice buoy substituted for it, but later, on the same date, the weather having moderated, the gas-lighted buoy was restored, the iron ice buoy remaining to mark the station in case the gas buoy should go adrift. On January 21, 1901, the buoy was upset by the ice and the light was extinguished. The buoy was therefore removed until the close of the ice season. It was reestablished on March 22, 1901, and remained in position during the remainder of the year.

514. Seventeen-Foot Knoll, No. 34.—This gas-lighted buoy, showing fixed white for ten seconds, separated by eclipses of ten seconds' duration, was established on April 1, 1901, off the southwesterly end of Marcus Hook Bar, New Jersey side of the Delaware River, and nearly abreast of the point at which vessels should take or leave the lower end of the Schooner Ledge range line, being substituted for the first-class red spar buoy of the same number formerly marking this station. It continued in operation until June 19, when the light was reported extinguished. A new buoy was placed on June 24, 1901, and continued in position during the remainder of the year. Some 8,886 cubic feet of gas were supplied directly to gas buoys during the year. Repairs were made to gas buoys. Two flashing devices for A-III buoys were purchased and fitted.

LIGHT-HOUSE DEPOTS.

Absecon, Atlantic City, New Jersey.—No work was done at this depot during the fiscal year.

Edgemoor, Delaware River, Delaware.—The frame of the storehouse was leveled up, the decayed sills were replaced with new ones, 3 new rolling doors and 8 new double windows were put in, 33 of the old windows were furnished with new frames, new weatherboarding was put on the walls, the roof was resheathed, finished with a cornice, and covered with tin, and the outside was given three coats of paint. The windmill pump rod was remodeled, a second eye-bolt for the lifting blocks was placed in the beam over the left hatch in the second floor, and a 1½-inch galvanized-iron pipe line was laid from the water tanks across the bulkhead, along the south wharf to the berth of the tender *Zizania*.

The following recommendation was made in the Board's last four annual reports:

The keepers of this depot are now obliged to live in Wilmington, about 4 miles distant. It is estimated that a suitable dwelling and necessary outbuildings can be built for not exceeding \$5,000. Recommendation is therefore made that an appropriation of this amount be made therefor.

The following recommendation made in the Board's annual report for 1900 is renewed.

The Board estimates that, as prices are at the present time, it will cost \$6,000, and recommendation is therefore made that an appropriation of this amount be made therefor.

Chincoteague, Chincoteague Inlet, Virginia.—No work was done at this depot during the fiscal year.

Cape May Boathouse, Cape May, New Jersey.—This boathouse is used by Northeast End light-vessel, No. 44, and Five Fathom Bank light-vessel, No. 40, for the care of their boats, sails, oars, etc., when ashore on leave. It is in good condition.

TENDERS.

Zizania.—This steel twin-screw steamer was built in 1887 and is of about 417 tons gross burden. Except during the 24 days she was laid up for repairs and the 8 days employed cleaning her boiler, she was employed in attending to the buoyage of the district, in delivering rations, fuel, and supplies to light-vessels and light-stations, and in conveying the inspector on inspection duty. She replaced and renewed 22 buoys, changed 135, lifted and painted 21, restored 5, shifted 3, placed 3, removed 6, discontinued 4, renumbered 5, and recovered 5 buoys. She delivered some 383 tons of coal and 7 cords of wood to light-vessels, and some 140 tons of coal and 9 cords of wood to light-stations. She also delivered provisions to 5 light-vessels and 10 light-stations, and necessary supplies to all light-vessels and light-stations. She conveyed the inspector upon his regular inspections. On October 5, 1900, she was sent to the general light-house depot for supplies, and on October 11, 1900, she returned with them to Edgemoor light-house depot. On December 18, 1900, she left Edgemoor with light-vessel No. 58 in tow, and on December 21, 1900, delivered her to the light-house tender *Verbena* at Newport, R. I., arriving again at Edgemoor on December 23, 1900. On June 29, 1901, she made a second

trip to the general light-house depot for the purpose of towing light-vessel No. 11 to the Fourth light-house district, arriving June 30, 1901. In doing this work she steamed about 12,289 miles, consuming about 965 tons of coal and 6 cords of wood. About 329 gallons of lubricating oil were used. Some 113 hours' work was done at the Edgemoor light-house depot and at the Iron Pier, Lewes, Del. Repairs were made to her as follows: Her bottom was cleaned and painted; a half-inch iron knee was made and fastened to her rail, bulwarks, and deck; the rail on her starboard side was refastened; 55 feet of white-oak guard was renewed and the guard iron was replaced; the pilot house and mess room were reglained and varnished; the saloon was painted and reglained; the ice box was relined, and a new set of gratings was furnished; an electric light was installed on her main truck; 1 electric light was installed, 1 electric bell was renewed, and all wires were overhauled; a damper rod to the smokestack was renewed; 2 connecting shackles were fitted to her starboard chain, and her port boat was repaired; sleeves were fitted to the propeller end of her port shaft; her stern bearings were refilled with lignum-vitæ; 4 crank-pin brasses were refilled with magnolia metal; 2 high-pressure link bars were replanned; 8 brace bolts in the back of the boiler were renewed; 2 soft patches were put on the seams of her boiler; 2 hard patches on the fronts of the furnaces; springs were fitted for high-pressure cylinders and for low-pressure slide valves; angle irons in the feed pumps were renewed; seats in both feed pumps were refastened; her donkey boiler was connected to the electric plant; 4 floor plates in the fire room were renewed; the steam pipes to the radiators were renewed, and the steam and exhaust pipes to the steering engine were repaired. An alco-vapor launch, 30 feet in length, of 7-horsepower was furnished. Paint, electrical supplies, dynamo oil, new wheel rope, kitchen and table ware, crockery, coal baskets, tallow, soap, mineral oil, grate bars, waste, lumber, stove fittings, galvanized buckets, hose, ores, a new gang plank, cylinder, lard and lubricating oils, brooms, brushes, bunting, one set code flags and book, canvas, new fire tools, bed linen, tools, manila rope, carpet, packing, gaskets, and engineer supplies were furnished.

Launch Leal.—This naphtha launch of about 5 tons burden assisted in general repair work. During the winter she was stored at the Edgemoor light-house depot. She was furnished with a new brass smokestack, lining and collar, a new burner, and air pump.

FIFTH DISTRICT.

This district extends from, but does not include, Metomkin Inlet, Virginia, to and including New River Inlet, North Carolina. It embraces all aids to navigation on the seacoast of Virginia and North Carolina between the limits named, all of Chesapeake Bay, the sounds North Carolina, and tributary waters.

Inspector.—Commander Albert Ross, United States Navy.

Engineer.—Lieut. Col. William A. Jones, Corps of Engineers, United States Army.

In this district are—

Light-houses and beacon lights, including 27 post lights.....	163
Light-vessels in position	4
7 or unlighted beacons	11
7 signals operated by steam, caloric, or oil engines.....	6
7 signals operated by clockwork	66
Distilling buoy in position.....	1
1 buoys in position	4
1 lighted buoys in position.....	3
100 buoys in position, including pile buoys and stakes.....	1, 115
3 tugs <i>Holly</i> , <i>Maple</i> , and <i>Violet</i> , buoy tenders, and for supply and inspection.	3
1 launch <i>Bramble</i> , used to supply gas to the beacons in the sounds of North Carolina.....	1
1 pipe (and gas tank) for supplying beacons and coast station.....	2
2 tugs <i>Jessamine</i> and <i>Thistle</i> , for construction and repairs.....	2

LIGHT-STATIONS.

142. Cape Charles, on Smith Island, entrance to Chesapeake Bay, coast of Virginia.—In May 268 assorted plants and 2 bushels of grass seed were furnished to the light-keepers for improving the grounds.

146. Old Point Comfort, entrance to Hampton Roads, Virginia.—July the tower lantern and gallery were painted. The old brick walls were replaced by new ones, 20 feet by 4 feet and 54 feet by 4 feet, laid in cement mortar. Sixty running feet of 4-inch sewer pipe was laid. In May 63 assorted plants, 8 packets of flower seeds, a lawn mower, and 150 feet of garden hose were furnished to the light-keepers for improving the grounds. Various repairs were made.

152. Lambert Point fog-signal Station, Elizabeth River, Virginia.—The fog-signal was reestablished on the old light-house structure on April 1, 1901, the necessary arrangements to that end having been completed in February. It is a bell struck by machinery a single time every $3\frac{1}{4}$ seconds. The fog-signal had been discontinued since December 31, 1892, when the light was permanently extinguished.

153. Western Branch Beacon, Elizabeth River, Virginia.—This beacon, which had been struck by a passing vessel, was repaired in August. April 11, 1901, the structure was carried away, presumably by some passing vessel, and it was decided in June to abandon the station, as being an expensive structure, the cost of which would not be justified.

635. *Sharps Island, entrance to Choptank River, Maryland.*—In January a scaffolding was erected on the exterior of the caisson, the necessary holes were drilled in the ironwork, and an additional pair of landing ladders were placed in position. A part of the gallery railing was cut out for entrance to the upper platform, and an iron gate with hinges was made and fitted in place. The requisite blocks and tackle were provided for raising and lowering the ladders. New ventilators were put in the lantern and new glass was fitted for the red sector. Soundings were made around the light-house. Various repairs were made.

636. *Choptank River, entrance to Choptank River, Maryland.*—Soundings were made around the light-house. Various repairs were made.

637. *Hambrook Bar beacon light, Choptank River, Maryland;* 638, 639. *Cambridge Harbor range lights, Maryland.*—Congress, by the act approved March 3, 1901, appropriated \$10,000 for the establishment of these lights. A boring was made in June at the proposed site of Hambrook Bar light.

640. *Bloody Point Bar, entrance to Eastern Bay, Maryland.*—Soundings were made around the light-house. Various repairs were made.

641. *Thomas Point Shoal, off Thomas Point, Chesapeake Bay, Maryland.*—Soundings were made around the light-house. Various repairs were made.

642. *Greenbury Point Shoal, entrance to Severn River, Maryland.*—Soundings were made around the light-house. Various repairs were made.

643. *Sandy Point, off Sandy Point, Chesapeake Bay, Maryland.*—Soundings were made around the light-house. Various repairs were made.

644. *Love Point, entrance to Chester River, Maryland.*—Some 954 feet of new decking was laid. Soundings were made around the light-house. Various repairs were made.

— *Chester River, Maryland.*—The following recommendation, made in the Board's last annual report, is renewed:

Three sets of range lights are needed on this river near the upper end of Swan Point, as there is a bar in this part of the river, with a narrow channel between it and the mainland, making navigation at night dangerous. It is estimated that these range lights can be established for not exceeding \$3,000, and it is therefore recommended that an appropriation of that amount be made therefor.

645, 647. *Queenstown Creek beacons, Maryland.*—In November four piles were driven alongside of beacon No. 1 to strengthen the structure. The beacon piles and the fender piles were bound together by four turns of chain. Boards were spiked to the beacon piles to increase the efficiency of the beacon as a day mark.

648. *Rock Hall Creek beacons, Maryland.*—The range lights, Beacons Nos. 1 and 2, were destroyed by ice during the winter.

649. *Baltimore light and fog-signal station, Patuxco River, Maryland.*—The following recommendation was made in the Board's annual report for 1899:

It is now evident that the expense of building a light-station in the 55 feet of semifluid mud which overlays the sandy bottom will be great. It is estimated that it will cost \$60,000, in addition to the \$60,000 already appropriated, to build this light-station at the site selected. The Board therefore recommends that \$60,000 be appropriated in addition to the \$60,000 appropriated by the act of August 18, 1894.

The following recommendation was made in the Board's annual report for 1900 and is renewed:

The Board now recommends that either this appropriation be made, or that authority be given to contract for the work at a cost not exceeding \$120,000.

655. *Fort Carroll, Patapsco River, Maryland.*—In October and November the position of the fog bell was changed, because the vibration of the lantern, induced when the fog signal was in operation, seriously affected the light. A new frame was made and set in the fog-bell room, and the bell was so placed in it as to be free from the flooring of the lantern. The tower supporting the light and fog bell was built in one of the old casemates of the fort. This casemate was recently demolished as a part of the scheme for the improvement of the harbor defenses, and this left the lower story of the tower open. This has been inclosed with tongued and grooved lumber, and a door and two windows have been fitted in one side. Various repairs were made.

657. *Leading Point, Patapsco River, Maryland.*—Some 30 running feet of new plank walk was laid in front of the dwelling. Various repairs were made.

658. *Lazaretto Point, Baltimore Harbor, Maryland.*—In September a new board walk, 24 feet long, was laid. Minor repairs were made.

666. *Currituck Beach, seacoast of North Carolina.*—In March a telephone system was installed to replace the burned-out call-bell apparatus. Minor repairs were made.

667. *Bodie Island, seacoast of North Carolina.*—The following recommendation, made in the Board's last annual report, is renewed:

There is but one dwelling at this station for the keeper and his two assistants, and it is impossible for them to have their families with them because of the lack of sufficient and proper accommodations. This fact does not tend to make the keepers contented or to induce that degree of interest in the station on their part necessary to maintain it in the best condition. It is estimated that an additional dwelling, with cisterns and the necessary outhouses, can be built for a sum not exceeding \$7,500, and it is recommended that an appropriation of this amount be asked therefor.

672. *Cape Lookout, seacoast of North Carolina.*—In November electrical supplies were furnished for the telephone line. In December the lens apparatus and the curtain rollers were put in order. Various repairs were made.

The following recommendation, made in the Board's last annual report, is renewed:

The accommodations for the keepers here are inadequate. Only one dwelling is provided for the principal keeper and his two assistants. Their families can not be with them, and at such an isolated and lonely place this is a hardship. Better service would be rendered by the keepers if quarters were furnished for their families. It is estimated that for \$7,500 a new building can be erected here, with cistern and outbuildings for the use of the principal keeper and for putting up solid partition in the present dwelling to make separate quarters for the first and second assistant keepers. The Board recommends that an appropriation of this amount be made therefor.

673. *Wreck Point beacon, Lookout Bight, North Carolina.*—A post painted brown, supporting a lens lantern 22 feet above high water, was erected in June on the northerly end of Wreck Point, westerly side of Lookout Bight. The light was shown for the first time on June 28, 1900.

674-684. *Gas-lighted beacons in North Landing River, Virginia, and Currituck Sound and North River, North Carolina.*—On November 1 the light at beacon No. 8 was moved from the end of the boat-

house at Long Point about 80 feet to the northward and suspended from a pole erected on the northeast end of the bulkhead. In December retort tubes, piping, fire brick, fire clay, and tiles for repairs of the gas apparatus were furnished. In April the fences at Long Point light-station, beacon No. 8, were repaired.

697. *Roanoke marshes, between Pamlico and Croatan sounds, North Carolina.*—A blower siren was installed, which will be used on and after July 1, 1901.

699. *Hatteras Inlet, Pamlico Sound, North Carolina.*—On October 8 the lens was replaced by a new one showing a flashing red light every 20 seconds. Various repairs were made.

702. *Northwest Point Royal Shoal, Pamlico Sound, North Carolina.*—An asbestos hood was supplied for the lamp reservoir in August and minor repairs were made. An appropriation of \$30,000 for rebuilding this light-house was made by the act approved March 3, 1901. Plans and specifications for the new structure have been prepared and are being printed.

707, 708. *Woodstock Point and Pantego Creek beacons, Pungo River, North Carolina.*—In April beacon structures were erected on the shoal off Woodstock Point, westerly side of Pungo River, North Carolina, and on the shoal making out from the westerly side of the mouth of Pantego Creek, northwesterly side of the river. Each beacon is composed of three piles, secured at the top by timbers on which is laid a floor to support a fixed white post-lantern light 12 feet above the water. Woodstock Point beacon is painted black and Pantego Creek beacon, red. They will be lighted on July 8, 1901.

709-711. *Rumley Marsh, Mauls Point, and Fork Point beacons, Pamlico River, North Carolina.*—In April beacon structures were erected at the following points in Pamlico River, North Carolina: Rumley Marsh, northerly side of the river; Mauls Point, southerly side of the river, and Fork Point, northerly side of entrance to Chock-winity Bay, southwesterly side of the river. They consist of three piles each, fastened together at the top by timbers, which is floored over to support the lantern boxes. Rumley Marsh beacon is painted red; Mauls Point and Fork Point structures are painted black. On and after July 8, 1901, they will each show a fixed white post-lantern light 12 feet above the water.

712. *McWilliams Point Shoal beacon, Pamlico River, North Carolina.*—This structure, which had been carried away by a passing vessel, was rebuilt in October. In April minor repairs were made.

715. *Point of Marsh beacon, below the entrance to Neuse River, North Carolina.*—Materials have been prepared for the building of this beacon except the fender piles, which can be procured more cheaply in the vicinity of the site. It is proposed to erect the structure at an early date.

717. *Clubfoot Creek beacon, Neuse River, North Carolina.*—In April a three-pile structure, painted black, was erected on the westerly end of Great Island Shoals, easterly side of the entrance to Clubfoot Creek. A fixed white post-lantern light, 12 feet above the water, will be shown from it on and after July 8, 1901.

719. *Otter Creek beacon, Neuse River, North Carolina.*—In April a lantern was repaired. In June the structure was rebuilt.

721. *Lower Green Spring, Neuse River, North Carolina.*—This structure, which was carried away by a passing vessel on January 23, was rebuilt and the light again shown on February 22, 1901.

723, 724. *Turn Stake and Green Shoal beacons, Neuse River, North Carolina.*—In April beacon structures were erected at Turn Stake, about 2 miles above Newbern, N. C., and Green Shoal, about 2½ miles above Newbern. They are each formed of three pine piles fastened together at the top, with a floor for the lantern box. Turn Stake structure is painted red and Green Shoal black. On and after July 8, 1901, they will show fixed white post-lantern lights, 12 feet above the water.

725, 726, 727. *Beaufort Harbor beacons, North Carolina.*—On December 15 three beacon lights were established to improve the navigation into the harbor of Beaufort, N. C. The structures are composed of three piles each, driven vertically, with six strips of 2-inch by 12-inch lumber spiked on each side at intervals of 6 inches. They stand in about 7 feet of water and are covered with yellow metal to a point above high water. Triangular platforms are built at the top for supporting the service boxes and lanterns. The lights show 12 feet above the water. Shark Shoal beacon stands on the point of shoal at the west entrance to Bulkhead Channel and is painted with horizontal stripes of red and black. Reids Creek beacon stands at the mouth of Reids Creek, westerly side of Bulkhead Channel, and is painted black. Lewis Thoroughfare beacon stands on the point of marsh on the north side of the western entrance to Lewis Thoroughfare and is painted with red and black horizontal stripes.

REPAIRS.

Repairs, more or less extensive, were made at the following-named stations:

540. Hog Island, Va.	656. Hawkins Point, Md.
543. Cape Henry, Va.	659. Pooles Island, Md.
557. White Shoal, Va.	668. Cape Hatteras, N. C.
561. Deep Water Shoals, Va.	671. Ocracoke, N. C.
583. Back River, Va.	687. North River, N. C.
585. Tue Marshes, Va.	688. Wade Point, N. C.
594, 597. Cape Charles City, Va.	689. Reeds Point Beacon, N. C.
599. Wolf Trap, Va.	690. Laurel Point, N. C.
602. Windmill Point, Va.	691, 692. Edenton Harbor Range, N. C.
608. Great Wicomico River, Va.	694. Alligator River Beacon, N. C.
612. Smith Creek Beacon, Md.	695. Croatan, N. C.
614. Piney Point, Md.	698. Long Shoal, N. C.
617. Cobb Point Bar, Md.	701. Southwest Point Royal Shoal, N. C.
620. Mathias Point Shoal, Md.	703. Harbor Island Bar, N. C.
621. Upper Cedar Point, Md.	704. Brant Island Shoal, N. C.
622. Maryland Point, Md.	706. Pungo River Beacon, N. C.
626. Solomons Lump, Md.	713. Rodman Point Shoal, N. C.
650. Craighill Channel, front, Md.	714. Windmill Point Shoal, N. C.
651. Craighill Channel, rear, Md.	716. Neuse River, N. C.
652. Seven-Foot Knoll, Md.	718. Wilkinson Point Shoal Beacon, N. C.
654. Cutoff Channel, rear, Md.	

LIGHT-VESSELS.

541. *Cape Charles light-vessel, No. 49, entrance to Chesapeake Bay, Virginia.*—This composite vessel was built in 1890-91, has a displacement of about 470 tons, and has a steam fog-signal. She remained on her station during the entire fiscal year. She was furnished from time to time with all needful supplies and is in fair condition.

544. *Tail of the Horseshoe, entrance to Chesapeake Bay, Virginia.*—The establishment of a light-vessel at this locality was authorized by the act approved February 18, 1899, and on October 15, 1900, light-vessel No. 71 was temporarily placed in the position formerly occupied by the bell buoy, to the southward of the southeasterly end of the Tail of the Horseshoe, at the junction of the main ship channel up the bay with the channel into Hampton Roads. This vessel remained on the station until June, when she was replaced by light-vessel No. 46. This latter vessel was received March 1, 1901, from the Fourth light-house district and, upon examination, was found to be in need of overhauling. She was brought to Baltimore and bids invited for doing the necessary work. A contract was entered into and she was hauled out, the zinc sheathing was removed, and the worm-eaten planks, parts of her keel, and the wood around the hawse pipe were cut out and renewed, a new sternpost was put in, and all sea connections were thoroughly repaired. The sheathing was then calked from keel to deck, and new zinc, weighing 26 and 28 ounces, put on and painted with one coat of zinc paint. The main and forecastle decks were renewed, a number of graving pieces were put in, and the seams were payed with white and red lead. One wooden-side fender was repaired, some rotten wood in the mainmast was cut out, and a scarfing piece fitted and bolted to the old mast, secured by two iron rings 3 inches wide. The water tanks were cleaned and cement-washed inside, the connections and valves were overhauled, the scuppers were repaired, and the main bilge and fire pump, together with all valves, rods, suction pipes, and strainers, were put in first-class condition. The feed pump, injector, and the fog-signal engine and whistle machinery were opened up, cleaned, and repaired, the boilers were retubed, all gauges and appliances connected therewith were tested and repaired where necessary, the old smokestack was taken down and a new smokestack and umbrella were fitted, riveted up, and securely stayed. The windlass was rolled out and a cast-iron bushing was put in on the starboard end and the windlass was put in thorough working order. The port bulwark, which was damaged by collision with the barge *Hercules*, belonging to the Philadelphia and Reading Railroad Company, was repaired and the bill therefor paid by the railroad company. The vessel was fitted out with a year's supply of stores and put on the station June 22, 1901.

550. *Bush Bluff light-vessel, entrance to Norfolk, Elizabeth River, Virginia.*—The composite schooner *Drift*, of about 87 tons gross burden, which was borrowed from the Coast and Geodetic Survey, is used to mark this station. At the beginning of the fiscal year she was in urgent need of a thorough overhauling and repair, and specifications covering all the work that could be seen were prepared, bids obtained, and a contract was entered into for putting the vessel in good condition. On September 4, 1900, the *Drift* was removed from her station and replaced by a gas-lighted buoy. She was then hauled out, and the metal was removed from the hull, the outside planking was replaced wherever found in bad condition, the seams were calked and payed with pitch to the height of the metal sheathing, and puttied above the copper line, and new 18-ounce sheathing put on. The rudder was removed, a new stock was made and fitted, and the pintles were repaired. The steering gear was overhauled, cleaned, and repaired, and a new mahogany wheel was fitted. The bowsprit was

repaired, bolted together, and fitted with iron bands to strengthen it. The main deck was entirely removed, together with the coamings at the companionways, skylights, and hatches and log pieces of the rail. A new deck of 3-inch white pine was laid and bolted to the deck beams with galvanized-iron bolts, new yellow-pine coamings were put in, and new skylights, companionways, and hatches were made and fitted; log pieces of rail were replaced and the pipe railing was straightened, repaired, and securely fastened. The masts, gaffs, pumps, and all blocks and catheads were overhauled and replaced where necessary. The standing rigging was lifted from the mastheads, overhauled, tarred down, set up, and fitted with new ratlines. The windlass was rolled out, overhauled, cleaned, repaired, and put in thoroughly good working order. The port chain stopper was replaced, and the port hawse pipe was refastened; the small boats were repaired, the boat davits were refastened, and cleats were furnished; the deadlights were overhauled and made water-tight, broken glass was replaced, and new rubber gaskets were refitted. A new hand bilge pump was put in, fitted with lead suction pipe, valves, etc., complete. The water tanks were taken out, cleaned, cemented, and new sills for them put in. The entire vessel, inside and out, including the deck-house, was given two coats of paint. When the plank sheathing was removed it was found that the iron frame had corroded and rusted, so as to be too weak for the new planking, and a strengthening frame, built of angle iron and plates, was designed and put in, adding greatly to the strength and rigidity of the entire hull. When the work was completed the vessel was fitted with stores, and on March 25, 1901, was placed on her station, where she remains.

670. *Diamond Shoal light-vessel, No. 69, off the outer shoals off Cape Hatteras, North Carolina.*—This steam composite light-vessel, built in 1897, has a displacement of about 589 tons, a steam fog-signal, and shows electric lights. At the commencement of the fiscal year this vessel was under repair at Baltimore, and about the middle of August the repairs were completed. She then proceeded to the Portsmouth (Va.) light-house depot, was fitted out with supplies for five months, and proceeded, under her own steam, to the station, relieving light-vessel No. 71 on September 2, 1900. She remained on the station without change, and without experiencing any difficulties, until February 17, 1901, when she was relieved by light-vessel No. 72. Upon being relieved she steamed into Portsmouth, Va., where she was hauled out and such minor repairs as were needed were made. She was then coaled up, furnished with the necessary supplies, and proceeded under steam to the Fourth district, relieving light-vessel No. 46 on the Overfalls Station. While she was on Diamond Shoal she was furnished, from time to time as needed, with supplies, rations, and the like.

670. *Diamond Shoal light-vessel, No. 71, off the outer shoals off Cape Hatteras, North Carolina.*—This steam composite light-vessel, built in 1897-98, has a displacement of about 589 tons, a 12-inch steam fog-signal, and displays two electric lights. At the commencement of the fiscal year this vessel was stationed off the Outer Diamond Shoal, where she remained until relieved by light-vessel No. 69, and, upon being relieved, she steamed to the Portsmouth (Va.) light-house depot, was at once fitted out with supplies, and placed as a temporary light-vessel on the Tail of the Horseshoe, entrance to Chesapeake Bay,

Virginia, where she remained until June 22, 1901. While on this station she showed oil lights instead of electric lights, and the steam plant was only used in case of fog or heavy weather, when it was necessary to use the engines. Upon being relieved by light-vessel No. 46 at the Tail of the Horseshoe, she at once proceeded to the Portsmouth (Va.) light-house depot, was hauled out, and all sea connections overhauled and repaired; the spar deck was calked and the main boiler was retubed; the cargo ports were overhauled and made to close tight; the evaporator gauge and all steam gauges were adjusted; the fog whistle valve and seat were faced up; the main injection valve was ground in; several new tubes were put in the donkey boiler, and the casting around the rudder head, the manhole hatches aloft, and the speaking tube from the engine room were repaired. The repairs being completed, she was coaled, furnished with all necessary supplies for four months, and on July 13, 1901, left for the Diamond Shoal station and relieved light-vessel No. 72 on the next day.

670. *Diamond Shoal light-vessel, No. 72, off the outer shoals off Cape Hatteras, North Carolina.*—This steam steel light-vessel was built in 1900, has a displacement of about 538 tons, a 12-inch steam chime whistle, and shows two electric-lights. She was delivered to the Light-House engineer by the contractors on February 7, 1901, at the Portsmouth, Va., light-house depot, and was at once fitted out with all necessary supplies for four and one-half months. She then steamed to Diamond Shoal, relieving light-vessel No. 69 on February 17, 1901, and has remained until the close of the fiscal year.

— *Cape Lookout Shoals light-vessel, North Carolina.*—The following recommendation in effect was made in nine preceding annual reports of the Board and is renewed:

Cape Lookout Shoals extend 8 miles beyond the point of the cape. There are dangerous breakers on the shoals 5 miles from the cape. When a vessel drawing more than 15 feet of water has made sufficient offing to just clear these shoals, she is 10 miles distant from the Cape Lookout Light. Although this light is of the first order, shown from a tower 150 feet high, and should be seen a distance of 18 miles under favorable circumstances, it may happen during thick or hazy weather that a mariner may fail to see it in time to avoid that line of shoals. A light-ship of the improved model now constructed for use at exposed stations, and provided with a steam fog-signal, to cost \$90,000, approximately, would be a valuable aid to navigation if placed near the southern extremity of the shoals. It is therefore recommended that an appropriation of that amount be made therefor.

In renewing this recommendation the Board states that these shoals form one of the most serious dangers to navigation along the southern coast. It seems that nearly all the disasters, especially to steamships, on Diamond Shoals are to vessels coming on the coast from the southward. A large trade enters Chesapeake Bay from the West Indies, and Hampton Roads is much frequented for bunker coal by steamers bound to Europe. These steamers coming up the coast make an offing to clear Lookout Shoals, and in so doing frequently run into the bight between Capes Lookout and Hatteras, seeing neither light and being so far inside of Diamond Shoal light-vessel that her light is not picked up. Furthermore, this shoal extends out across the direct course of coastwise traffic between Diamond Shoal and Fry-Pan Shoals light-vessels, which passes over the outer portion of the shoal in from 4 to 6 fathoms of water. A slight deviation from the regular course carries a steamer among the shoal spots, on which she is in danger of stranding. During June, 1901, the British steamship *Starcross*, bound

into Hampton Roads for coal, stranded on this shoal. Owing to favorable weather she was floated, but at a cost of some \$15,000, paid to the wrecking companies. The establishment of a light-vessel on Cape Lookout Shoals would do much toward insuring the safety of vessels on this very dangerous coast.

Relief light-vessel for the Fourth and Fifth light-house districts.—By the act approved July 1, 1898, an appropriation of \$95,000 was made for constructing, equipping, and outfitting complete for service a first-class steam light-vessel with steam fog-signal. She was built at Weymouth, Mass., delivered by the contractors on February 7, 1901, at the Portsmouth, Va., light-house depot, was fitted out and on February 17, was placed on the Diamond Shoal, North Carolina, light-vessel station. She is elsewhere described as Diamond Shoal light-vessel, No. 72.

FOG SIGNALS OPERATED BY STEAM, CALORIC, OR OIL ENGINES.

541. *Cape Charles light-vessel, No. 49, entrance to Chesapeake Bay, Virginia.*—This 12-inch steam whistle was in operation some 142 hours and consumed about 17 tons of coal.

543. *Cape Henry, south side of entrance to Chesapeake Bay, Virginia.*—This first-class steam siren was in operation some 299 hours and consumed about 27 tons of coal.

544. *Tail of the Horseshoe light-vessel, No. 71, entrance to Chesapeake Bay, Virginia.*—This 12-inch steam whistle was established October 15, 1900, and was in operation some 201 hours and consumed about 8 tons of coal.

599. *Wolf Trap, west side of Chesapeake Bay, Virginia.*—This second-class Daboll trumpet, operated by a petroleum engine, was in operation some 260 hours and consumed about 140 gallons of mineral oil.

609. *Smith Point, entrance to Potomac River, Virginia.*—This second-class Daboll trumpet was in operation some 298 hours and consumed about 356 gallons of mineral oil.

670. *Diamond Shoal light-vessels, Nos. 69, 71, and 72, off the outer shoals off Cape Hatteras, North Carolina.*—These 12-inch steam whistles were in operation some 159 hours and consumed about 5 tons of coal.

DAY OR UNLIGHTED BEACONS.

Leading Point, Maryland.—A rotten guy post was replaced. The mast supporting the ball was repaired and painted.

The other day beacons are in fairly good order.

POST-LIGHTS.

James River, Virginia.—On May 1, 1901, a fixed white light was established at the lower end of Graveyard Reach and another at the mouth of Kingsland Creek, at the upper end of Graveyard Reach. On April 22, 1901, the spindle on Woodsons Rock, James River, from which the Meadowville post-light was shown, was carried away by drift logs in a freshet.

BUOYAGE.

The past winter having been less severe than usual, the quantity of running ice did not cause serious damage or displacement to the buoys. The buoys in the Patapsco River, marking the dredged channels to Baltimore, were occasionally dragged out of place, but were put back at the first opportunity. The stakes in Core Sound, North Carolina, were fairly well kept by contract, and this method seems to give satisfaction.

LIGHT-HOUSE DEPOTS.

Lazaretto Point, Baltimore, Md.—In February, 1901, the roof of the warehouse was repaired. In June the sashes of seven windows were reglazed and painted, and the inside doors were painted. A room and hall in the keeper's quarters and his kitchen were also painted.

The following recommendation, made in the Board's last eleven annual reports, is renewed.

Attention is invited to the necessity of providing a dwelling at this depot for the accommodation of the depot keeper and his family. Their quarters in the warehouse are unsuitable and uncomfortable, and, even were the rooms not required for other purposes, it would cost nearly as much to make them comfortably habitable as it would to build a new dwelling. About one-third of the space on the upper floor is reserved for the use of custom-house inspectors, and the large and increasing amount of work on hand in the district demands the use of all storage and shop room available. The depot keeper must be constantly on the spot, and can not live away from the premises. There is ample room on the Government tract for such a building as is required, and it can be built for \$2,500. An appropriation of this amount is earnestly recommended.

Point Lookout, Maryland.—This depot is in very fair condition. A part of the coal shed is in urgent need of new flooring, and the wharf should be repaired at an early date.

Light-house Wharf, Washington, D. C.—The following recommendation, made in the Board's last annual report, is renewed:

The old wharf at O and Water streets, Washington, D. C., belonging to the Government, was temporarily repaired for use by the Light-House Establishment. An examination of this wharf showed that it was in such bad condition that only minor repairs were then advisable, and they were made, so that temporarily the wharf is in usable condition. To make it suitable for the reception and temporary storage of material, such as buoys, etc., its complete rebuilding will be required, as the sills, joists, and piles show much decay.

It is estimated that this wharf can be put in proper condition for a sum not exceeding \$60,000, and the Board recommends that an appropriation of this amount be made therefor.

Portsmouth, Va.—The repairs and improvements commenced in May, 1900, were completed in August. The rebuilding and enlarging of the storehouse for mineral oil was completed, providing a structure 43 feet 8 inches by 48 feet in plan, 10 feet high on the sides and 19 feet 6 inches in the center, with walls 13 inches in thickness. A brick pavement was laid on one side of the house and the pavement on the other side was relaid. Around the building was laid another pavement of brick. The boards between the tramway tracks in the house were taken up and replaced by a brick pavement. The floor area of the boathouse was doubled by extending the sides, and the brick retaining wall was lengthened. The shutters of the buoy shed were repaired. A brick pavement was laid from the tramway to the office and a hood

was placed over the office door. A fence, provided with a double and a single gate, was put up on the street front.

Washington, N. C.—Plans and specifications for a detached dining room and kitchen, and for repairs to the buoy and coal sheds, bulkhead, custodian's dwelling, and entrance gate have been prepared, and the work is being done.

Annapolis, Md.—A force pump and 100 feet of hose were furnished. The structure formerly used by the Navy for the storage of targets and coal was moved 337 feet to a point near the shore front of the wharf, and was repaired and will be used as a buoy shed. Some 135 running feet of tramway was laid to connect the track on the wharf with the buoy shed. The building formerly used as an office was thoroughly repaired. Repairs were made to the custodian's dwelling, putting it in good condition. Various other repairs were made.

LIGHT-HOUSE TENDERS.

Maple.—This steel twin-screw steamer was built in 1892, and has a displacement of about 551 tons. She was employed in supplying and inspecting the light-houses and light-vessels and in working buoys. She kept Diamond Shoal light-vessel supplied with coal and stores during the entire year, and worked all the buoys on the seacoast and in the inlets. On February 28, 1901, she convoyed light-vessel No. 69 from Portsmouth, Va., to Overfalls Station, in the Fourth light-house district, and towed light-vessel No. 46 back and delivered her in Baltimore for repairs. In September she was docked, her bottom cleaned and painted, the spar deck was calked, new davits were put in place for the alco-vapor launch, and minor repairs were made to the boilers. In installing the davits for the alco-vapor launch it was found necessary to remove the whaleboat to the position occupied by the dingy, and by so doing it cramped the room on the hurricane deck for the storage of boats. In November, 1900, a contract was made for the construction and delivery of two new marine boilers, which boilers were completed and accepted on June 25, 1901. Contract was made for installing these boilers in the *Maple*, for putting on a new iron deck house in place of the present wooden one, for extending the house out to the rail from the engine room aft, and for making other necessary repairs. During the year she steamed some 13,229 miles, and consumed about 1,314 tons of bituminous coal. She was employed 81 days on inspection duty, 111 days in working buoys and attending to light-vessels, 62 days in delivering fuel, rations, and supplies to light-stations, 90 days at light-house depots coaling, loading supplies and buoys, and in doing other necessary work, and she was 21 days under repair. She worked 482 buoys, visited 237 light houses and vessels, delivered some 347 tons of coal and 103 cords of wood to the light stations and vessels, supplied 42 light-stations with rations, inspected 127 light-stations, and the crew was employed 40 days at light-house depots cleaning and painting buoys.

Violet.—This wooden side-wheel steamer was built in 1861, and is of about 231 tons gross burden. At the beginning of the fiscal year she was under repair, and was not ready for service again until the latter part of November. From that time until the close of the fiscal year she was employed in supplying and inspecting light-houses and working buoys. She has kept all the light-stations in the sounds of North

Carolina and tributary rivers furnished with annual supplies, rations, fuel, and oil, and worked all the buoys in those waters. On July 31, 1900, a contract was made for repairing this steamer, which work was completed in November. She was hauled out, the metal removed, and all rotten or unsound planking was renewed, all the sea valves and connections were overhauled, the seams were calked, and the metal was replaced. The logs under the guards at the wheels were removed and replaced by new oak logs of the same dimensions, new oak rail pieces were fitted to the bulwarks, forward and aft, new log sills were fitted forward, flush-chocks of iron were fitted in the log sills near the bow, the rail at the buoy ports was fitted so as to readily ship and unship, and the rotten stanchions in the bulwarks were renewed. The paddle boxes were repaired and the deck and the gangways, including the officers' rooms, were calked; all rotten wood was removed, and graving pieces were fitted and then painted; the forward knee to the port buoy gangway was renewed and covered with galvanized iron; the anchor davit was shortened; the lugs on the end of the derrick boom were repaired; new galvanized iron was placed on the planking on the starboard side; the boat davit sockets were overhauled; the fender pieces on the guards were refastened; two new wooden chocks were put in; the steering gear was thoroughly overhauled and put in working order. A new sink with entire new plumbing was fitted in the galley, the pilot house windows were renewed, all windows and doors throughout the vessel were overhauled, repaired, fitted with new locks and hinges, and made water-tight. The floor of the coal bunkers was removed, a new yellow-pine ceiling was fitted, and the rail on the upper deck was renewed, together with such stanchions as were found to be rotten. Two iron davits, 4 inches in diameter, were made and fitted for the alco-vapor launch, carried down through the superstructure deck, and stepped into iron sockets placed on the main deck. The deck was strengthened by stanchions in order to carry the weight of this launch, and the necessary chocks, ringbolts, and other fittings for the launch were furnished. The boiler, built in 1893, had seriously deteriorated, and a new flue, 14 inches in diameter, 5 feet 10 inches long, was fitted; new furnaces, with new legs, both back and side, and new flue sheets were put in; new socket stay bolts and braces fitted; hand-holes cut where needed, and the seams of the boiler were calked and made tight. New cast-iron ash pans, new grate bars, and a complete set of fire tools were furnished. The engine was overhauled; the check valves on the feed pipes, the bottom blow valve, and the stop valves in the main steam and main feed pumps were ground in hot; a new spring check valve was fitted in the inspirator feed pipe; a new plug water cock to the sea-valve pipe, and two new brass valves to the salinometer. The paddle wheels were overhauled and repaired, the old hoisting engine was removed, and a new double-cylinder, 8½ by 9 inch hoisting engine was installed, with all necessary changes in piping, valves, etc. An electrical bell system was installed. After these repairs were completed the vessel was found to be in excellent condition for service, but the covering was not replaced on the boiler until it was found that the work done was tight. After having been in commission during the entire winter, a few leaks which had developed in the boiler were stopped, the covering replaced, and the boiler is now in excellent condition. During the year she steamed about 7,741 miles and consumed some 425 tons of bituminous coal.

She was employed 65 days on inspection duty, 57 days in working buoys and attending to light-vessels, 21 days in delivering fuel, rations, and supplies to light-stations, 74 days at depots coaling, loading supplies and buoys, and doing other necessary work, and was 148 days under repair. She worked 241 buoys, visited 169 light-houses and vessels, delivered 8 tons of coal and 2,350 cases of mineral oil to the stations and vessels, supplied 18 light-stations with rations, inspected 151 light-stations, and the crew was employed 18 days at light-house depots cleaning and painting buoys.

Holly.—This iron side-wheel steamer was built in 1881, rebuilt and sheathed with wood in 1898, and is of about 367 tons gross burden. She was employed during the entire year in work of supply, inspection, and attending of buoys. In July a new pillow block was fitted, the deck was jacked up, stanchions were fitted under the wheelhouse, the steering chains were overhauled, and minor repairs were made. In February, the steering gear having proven unsatisfactory, the monkeytail of the rudder was removed, a quadrant was substituted in its place, and the lead of the steering chains was altered. The vessel was docked, the bottom was cleaned, and the strainers and the pipe connections were overhauled and repaired. A new cast-iron floor was put in the fire room and new ash-pan doors were fitted, the main stop valve and the copper feed and steam pipes of the feed pump were overhauled and repaired, a pump brake was fitted to the after-deck pump, two ring bolts for the hoisting engine were put in the forward deck, deck levers were fitted to the anchor windlass, the cut-off valves to the hoisting engine and windlass were refitted, and the pressure gauge of the vapor launch was tested and repaired. The side of the mast and the joiner work on the starboard side of the vessel were repaired, leaks in the mainrail and covering board around the wheelhouse were stopped, the quartermaster's room was fitted up with two berths, and the gig was repaired. At such intervals as her services could be spared, the boiler has been blown off and cleaned, and kept in good condition. Her general condition now is excellent, and the boilers and machinery are in good working order. The condition of the apparatus for extinguishing fires and the bilge pumps is excellent. During the year she steamed some 10,374 miles, and consumed about 794 tons of bituminous coal. She was employed 40 days on inspection duty, 130 days in working buoys and attending to light-vessels; 45 days in delivering fuel, rations, and supplies to light-stations; 115 days at depots coaling, loading supplies and buoys, and doing other necessary work, and was 35 days under repair. She worked 410 buoys, visited 264 light houses and vessels, delivered 152 tons of coal and 88 cords of wood to the stations and vessels, supplied 10 light-stations with rations, inspected 131 light-stations, and the crew was employed 36 days at light-house depots cleaning and painting buoys.

Bramble.—This twin-screw launch, built in 1879, is of about 32 tons gross burden. During the year she attended to the gas beacons in the sounds of North Carolina, and in so doing was under steam 620 hours and ran about 1,803 miles, consuming some 39 tons of bituminous coal. She delivered about 82,640 cubic feet of gas to different beacon lights. In June she was hauled out, the boiler was repaired, cleaned, and painted, and the propeller shaft was straightened.

Juniper.—The *Bramble* being deteriorated beyond repair, Congress, by act of June 6, 1900, appropriated \$20,000 with which to build a

vessel to replace her. Plans and specifications for that purpose were prepared and bids for doing the work were called for by advertisement. The three bids received and opened on July 3, 1901, were rejected, as the lowest was for a greater sum than the amount of the appropriation. The cost of labor and material is now much greater than several years ago, when the estimate was made. The needs of the service have also increased, so that a more efficient vessel is needed. The Board finds that it can now build such a tender as is needed to replace the *Bramble* for \$32,000. Recommendation is therefore made that \$12,000 more be appropriated for this purpose, and, as the vessel is much needed, that the sum be made immediately available.

The *Sharpie* was taken to Portsmouth, Va., in June, new partners and new mast step were fitted to the foremast, and a new bench was fitted to the mainmast; two intermediate keelsons, 8 feet long, were fitted, chafing battens were renewed, about 30 square feet of new plank was put in the bottom, the top sides were repaired, graving pieces were put in the port side and in the deck, a new stem was put on, the rudder was repaired, and about 12 square feet of canvas on the after deck was renewed. She was hauled out and her bottom was cleaned and painted.

Jessamine.—This iron side-wheel steamer was built in 1881, and is of about 257 tons gross burden. She was engaged during the year in the inspection of 39 light-stations and 2 light-house depots; in the installation of fog signals at Lambert Point, Virginia, and Roanoke Marshes, North Carolina, and of fifth-order lamps at Jones Point light-house, Virginia; in making borings at the sites of Point No Point light-house and Hambrook Bar beacon, Maryland, and in locating the sites for Cambridge Harbor lights and Clubfoot Creek and Point of Marsh beacons, North Carolina. She helped to make repairs at 29 light-stations. She was laid up 41 days for necessary repairs to her boiler and machinery and for completing the installation of her electric-lighting plant. During the year she steamed some 8,406 miles and consumed about 727 tons of bituminous coal.

Thistle.—This wooden screw steam tender was built in 1890, and is of about 32 tons gross burden. She was employed in towing the working plant, materials, and repair party, and otherwise assisting in the work of repairs and improvements at 32 light-stations and 2 light-house depots, and in relocating the buoy on the site of the new light-house at Hooper Island, Maryland. In the prosecution of the above work she ran 884 miles in towing the working plant and steamed alone 4,684 miles, making a total of some 5,568 miles, with a consumption of about 178 tons of bituminous coal. She was inactive 33 days, when repairs were made to her hull, engine, and boiler. She was under steam 4,045 hours during 282 days, her engine being in motion 1,033 hours during 239 days.

WORKING PLANT.

The large scow.—This vessel was hauled out of the water in October, the bottom cleaned, and 10 sheets of new copper put on. The rudder plug was repaired, a new windlass and facing pieces were put on, the deck was calked, the seams were filled with red-lead putty, and anti-septic wash was injected into all the openings below the deck. A new screw bolt was put in the tiller. Eight large and three small rope

fenders were made. The deck was painted two coats and the sides one coat. In November the pilot house, companion way, galley, and water-closet were painted, inside and outside, and the waist inside. Eight scow poles, 20 feet long, and two sounding irons, 25 feet and 16 feet, were made. In December four white-oak rudder chocks, 7 inches by 10 inches by 4 feet, were made. In February a hatchway cover, with glass panels, was made for the galley.

The small scow.—In June the bottom and worm-eaten timbers and parts of the sides were renewed. The bottom and side seams were calked. Two new white-oak bitts were provided. The bottom was given two coats of carbolineum, inside and outside.

The pile-driver scow.—In October the water tank was cleaned, the bulkhead was repaired, and the tank was refilled. A brick floor was laid in front of the boiler. The engine was overhauled and cleaned, and rubber gaskets were put in the head of the steam chest. Six wooden fenders, one rope fender, eight screw rings for securing them, three iron hooks, and three staples were made. In June the scow was docked, new fore-and-aft sills were put on, and part of the sand boards were renewed. Openings in the end were filled, calked, and covered with sheet copper laid on felt. Two new anchor chocks were made and secured to the upper part of the vessel. The sills and sand boards were treated with carbolineum.

SIXTH DISTRICT.

This district extends from, but does not include, New River Inlet North Carolina, to and includes Jupiter Inlet light-station, Florida. It embraces all aids to navigation on the seacoast, bays, sounds, harbors, rivers, and other tidal waters of North Carolina, South Carolina, Georgia, and Florida between the limits named.

Inspector.—Commander John A. Rodgers, United States Navy.

Engineer.—Capt. J. C. Sanford, Corps of Engineers, United States Army.

In this district there are—

Light-houses and beacon lights, including 113 post lights.....	20
Light-vessels in position	
Light-vessel for relief	
Day or unlighted beacons.....	4
Fog-signals operated by steam.....	
Fog-signals operated by clockwork.....	
Whistling buoys in position.....	
Bell buoys in position.....	1
Other buoys in position.....	29
Steamer <i>Wistaria</i> , buoy tender, and for inspection and supply.....	
Schooner <i>Pharos</i> , for construction and repair	
Naphtha launch <i>Water Lily</i> , for inspection and supply.....	
Naphtha launch <i>Snowdrop</i> , for construction and repair.....	

LIGHT-STATIONS.

— *Cape Fear, seacoast of North Carolina.*—In the Board's last annual report it was stated that under an act approved July 1, 1898, an appropriation of \$35,000 had been made for establishing a first-order light-station at or near the pitch of Cape Fear, North Carolina, and that authority was given by the same act to contract for a station in a sum not to exceed \$70,000; that the site selected had been obtained by process of condemnation, and that as soon as the assessed award of \$4,000 had been paid into the United States court, and the additional \$35,000 needed had been appropriated, contract for the establishment of the station would be made. The additional \$35,000 was appropriated by Congress by the act approved March 3, 1901, and in the meantime the award of \$4,000 had been paid and proposals invited for furnishing all necessary labor and materials. In April, 1901, contract was entered into. The work for the tower is being prosecuted. A few castings have been made, but delay has been occasioned in consequence of a workmen's strike. Work is about to begin at the site of Smith Island, North Carolina.

729. *Cape Fear, seacoast of North Carolina.*—No repairs were made at this station, as it is to be discontinued upon the establishment of the first-order light-station, above referred to, on the pitch of Cape Fear. Its condition is fairly good in essentials.

— *Range lights for dredged channels in the Cape Fear River, North Carolina.*—In its last nine annual reports the Board recommended that certain changes be made in the system of post lights in the Cape Fear

River, between its entrance and Wilmington, N. C., to guide through channels dredged to a depth of 20 feet at mean low water. Since the date of the original recommendation conditions in the main channel have changed, and a modified project has been approved which will be carried into effect during the coming year.

759. *Sampit River, Winyah Bay, South Carolina.*—This beacon was run into and damaged by a loaded scow. The damage was made good by the owners of the scow.

762. *Bull Bay, South Carolina.*—The beacon was lighted on September 8, 1900, the work of reestablishing it having been completed.

765. *Fort Sumter, Charleston Harbor, South Carolina.*—The structure, excepting the beacon, was painted light green to conform to the color of the beacon of the fort. The beacon was left white to bring it into strong contrast with adjacent buildings, so as to make it a distinctive day mark.

766. *St. Phillips Church, Charleston, South Carolina.*—Repairs were made to the electric apparatus for lighting the gas-burner in the locomotive headlight, which is used for lighting this beacon in this church tower.

767-768. *Mount Pleasant, Charleston Harbor, South Carolina.*—A boathouse on metaled piles and a fireproof oil house were built. About March, 1901, the changes in the dredged channel into Charleston Harbor made it necessary to change the sailing line of this range and two new beacons were erected. Both beacons were located in the water. The front one consists of a group of three metaled piles with a lantern gallery and square day mark, supporting a fixed red locomotive headlight with a focal plane of 14 feet. The rear one consists of a substructure of four metaled piles, the superstructure being an iron pipe beacon, with a lantern gallery and a day mark of iron slats, supporting a fixed red locomotive headlight with a focal plane of 40 feet. The old rear beacon was abandoned, but the old front beacon was retained under the name of Moultrieville beacon. The illuminating apparatus was changed from a fixed red lens lantern to a white post lantern.

769-770. *South Channel range, Sullivans Island, Charleston Harbor, South Carolina.*—New sills were put under the front beacon, and brick piers were substituted for the tramway designed to allow a change of position when it served as a front beacon for the old Morris Island channel. Minor repairs were made.

773. *Moultrieville beacon, Charleston Harbor, South Carolina.*—This was formerly the front beacon of the old Mount Pleasant range, and is retained as a guide into the cove in the rear of Sullivans Island, South Carolina, a post lantern being substituted for the lens lantern formerly used.

775-776. *Hog Island Channel beacons, Charleston Harbor, South Carolina.*—Beacon No. 2 was carried away by collision on October 18, 1900, and was rebuilt and relighted on November 3, 1900.

778-783. *Ashley River beacons, South Carolina.*—Six beacons were built in the Ashley River, between Charleston and Bees Ferry, and were lighted on December 16, 1900. The beacons are all built on one general plan, consisting of three metaled piles with focal planes varying from 11 to 26 feet above mean high water. The highest beacon carries the rear light of a range to lead through the dredged channel of Cow Head Shoal. The others stand on either side of the channel of Ashley River. The system of lights enables vessels to reach at all

times extensive mines of phosphate, which are the source of a considerable commerce.

791-792. *Paris Island, entrance to Beaufort River, South Carolina.*—A wooden revetment, 80 feet long, was built in front of the beacon to lessen the erosion of the site by high tides. Various repairs were made.

793. *Skull Creek beacon, Port Royal Sound, South Carolina.*—This beacon was destroyed by fire in March and was rebuilt and lighted on May 22, 1901.

798-799. *Tybee, entrance to Savannah River, Georgia.*—The firing of heavy guns, in the recently erected battery adjacent, brought down the plastering of the principal keeper's dwelling to such an extent as to make it necessary to substitute ceiling boards in place of plaster. This was done over the whole house and the ceiling was finished in hard oil. Various repairs were made.

802. *Cockspur Island beacon, Savannah River, Georgia.*—Both the boat landings, one at its site in the water and the other on Cockspur Island, were extended 20 feet on metaled piles.

824. *St. Catherines Sound, seacoast of Georgia.*—At the date of the Board's annual report the status of the condemnation proceedings which had been instituted by the United States for the acquisition of title to the site desired for this station was as follows:

The case had been brought to a hearing in the United States circuit court for the southern district of Georgia, and a jury had been selected to assess the damage done to the owner of St. Catherines Island and the value of the site. The jury awarded \$100,000 for $7\frac{1}{2}$ acres, although the value of the whole island, some 13,000 acres, as by sworn returns for taxation by the owners, had been put at \$38,000. This excessive award being prohibitory, in April, 1901, it was decided that condemnation proceedings should be renewed, and in May, 1901, the Department of Justice was requested by the Treasury Department to begin condemnation proceedings de novo, and to direct the United States attorney for Georgia to put himself in communication with the engineer of the district in order that they might act together in the case. So far no communication has been received from the United States attorney.

825. *Sapelo, seacoast of Georgia.*—The following recommendation, made in the Board's last annual report, is renewed:

The sea is rapidly encroaching on the site, and spring tides sometimes reach the piazza of the keeper's dwelling and the base of the light tower. It will become necessary soon to move these structures. The Board therefore deems it necessary to purchase a new site and to erect a combined light tower and keeper's dwelling in place of the buildings, which it is evident will not last much longer. It is estimated that a new site can be purchased and that new buildings can be erected at a cost not exceeding \$40,000. Recommendation is therefore made that an appropriation of this amount be made therefor.

826-827. *St. Simon, seacoast of Georgia.*—In September, 1900, the foundation of the front beacon having been so much undermined by high tides and the range being so short as to prevent its removal backward upon the range line, a pile foundation was prepared and the beacon was placed upon it.

828-833. *Brunswick Harbor ranges, Georgia.*—During June, 1901, the rear beacon of Colonels Island range was struck by lightning. The damage has been repaired.

— *The inside passage from Savannah, Ga., to Fernandina, Fla.*—In its last twelve annual reports the Board recommended that it be

empowered to erect and maintain 25 post lights in order to facilitate the navigation of the inland passage from Savannah to Fernandina, at an estimated cost of \$4,000. An appropriation of this amount has been recommended. This recommendation is renewed.

834. *Jekyl Island Jetty beacon, Brunswick River, Georgia.*—In September, 1900, a triangular wooden beacon of three piles, with a square day mark and a fixed red post lantern, with a focal plane 13 feet above mean high water, was established at the extreme end of Jekyl Island Jetty to mark the entrance into the mouth of Jekyl Creek.

841. *St. Johns River (rear beacon of Mayport range), Florida.*—An earth bank 3 feet high was thrown up to keep spring tides out of the garden. Various repairs were made.

845. *Fort George Creek range beacons, entrance to St. Johns River, Florida.*—A shifting of the channel through which this range is intended to guide necessitated a change in the position of both beacons. It was found, however, that the rear beacon of Pilot Town range would serve also as the rear beacon of the new Fort George Creek range. One beacon was therefore built to serve as the front beacon of the new range, and the old rear beacon was abandoned.

— *Reimbursement of light-keepers for personal losses sustained during the cyclones of August 27 and 28, 1893.*—The following statement, made in the Board's last seven annual reports, is repeated:

A number of keepers of light-houses, the officers and crew of a light-vessel, and the keeper of a buoy depot sustained more or less heavy personal losses when the stations where they were employed were wrecked. Many of them displayed much devotion to the service and incurred great personal danger.

The Board therefore brought these matters to the attention of the honorable Secretary of the Treasury, and he, in letters of November 9 and 16, 1893, and January 29, 1894, to the Speaker of the House of Representatives, transmitted the sworn statements of each keeper as to his losses, indorsed by Commander M. R. S. Mackenzie, United States Navy, inspector of the Sixth light-house district, and recommended that provision be made by Congress for the reimbursement of the losses sustained by these keepers. The losses, as shown in these statements, amount to \$2,399.13. Recommendation is made that an appropriation of that amount be made for the reimbursement of losses sustained by the light-house employees in the Sixth light-house district.

Similar losses were sustained by light-keepers in the Eighth light-house district during the hurricane of October 1, 1893. Statements of the losses they sustained, duly approved and indorsed by the light-house inspector, were sent to the Speaker of the House of Representatives by the Treasury Department in its letters of January 29, March 7, and April 3, 1894, with recommendation that reimbursement be made. The sum of these losses, as stated, amounts to \$2,603.62. Recommendation is made that an appropriation of this amount be made for the reimbursement of the losses sustained by light-house employees in the Eighth light-house district.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

761. Cape Romain, S. C.
771. Fort Ripley Shoal, S. C.
787. Hunting Island, S. C.
789-790. Hilton Head, S. C.
796-797. Bloody Point, S. C.
805-806. Tybee Knoll Cut range, Ga.

807. Long Island east beacon, Ga.
809. Venus Point, S. C.
820-821. Fort Jackson range, Ga.
835. Little Cumberland Island, Ga.
935. Jupiter Inlet, Fla.

LIGHT-VESSELS.

728. *Frying Pan Shoals, No. 1, seacoast of North Carolina.*—This wooden light-vessel was built in 1855, is of about 275 tons gross burden, old measurement, and has a steam fog-signal. On March 15, 1901, she

was brought to Charleston and light-vessel No. 29 was temporarily placed on the station. She was hauled out, cleaned, and patched, two pieces of plank were renewed under the after part of the port rolling chock, about 100 sheets of yellow metal and about 1,000 pounds of sheet lead were put on her bows, the rudder was unshipped, and minor repairs were made to the rudder and sternpost. New quick work, the oak planking on the bulwarks, and part of the rail were renewed, two new masts and topmasts, a new bobstay and new trysail masts were put in place, the rigging was overhauled and the day marks were repaired, a riding stopper was put in on the starboard side, the winch on the forward deck was blocked up so as to clear the riding stoppers, a new galley stove and cooking utensils were supplied, some crockery was renewed, and the medicine chest was replenished. The machinery of the fog-signal was overhauled and some piping was renewed. A bench vise with attachments was supplied. Fifteen tons of coal and one-half cord of wood were put on board. The vessel returned to her station on May 3, 1901, and the light-vessel No. 29 was brought to Charleston.

764. Charleston, No. 34, off Charleston Harbor, South Carolina.—This wooden light-vessel was built in 1864, is of about 150 tons gross burden, old measurement, and has a bell fog-signal. She was not off her station during the year. A fog-signal operated by an oil engine and an air compressor are soon to be installed.

788. Martins Industry light-vessel, No. 53, off the seacoast of South Carolina.—This steam light-vessel was built in 1892, and is of about 491 tons displacement. On May 4, 1901, she was taken to Charleston for repairs, and light-vessel No. 29 was temporarily placed on her station. She was hauled out, her bottom was cleaned and painted, six valves were renewed, chafing rings were put in on the outside of the hawse pipe, some general supplies were furnished, one new shot of chain, 35 tons of coal, and 3 cords of wood were put on board. The vessel was returned to her station on May 23, 1901, and light-vessel No. 29 was brought back to Charleston. A comparative statement of the cost of maintenance of this steel vessel for 7 years, as against the wooden vessel No. 1 for the same time, shows that the steel vessel is the cheaper, the damage from the teredo being especially considered.

Relief light-vessel, No. 29.—This wooden light-vessel, of about 150 tons gross burden, was built in 1864. She has a bell for a fog-signal, and is kept at Charleston for a relief light-vessel. On March 15, 1901, she relieved Frying-Pan Shoals light-vessel, No. 1, and was returned to Charleston May 3, 1901. She relieved Martins Industry light-vessel, No. 53, May 4, 1901, and was returned to Charleston May 23, 1901. During the year a new hawse pipe, a new chock and fastenings were put in on her port bow, a strap for the davit was renewed, some minor repairs were made to the woodwork, the trysail mast was renewed, and a new cathead was put in on the starboard side. This is a very old vessel, and it is estimated that about \$6,500 will have to be expended to put her in serviceable condition.

DAY OR UNLIGHTED BEACONS.

There are in this district 49 day or unlighted beacons. Eleven day marks were built by the engineer during the year and four were discontinued. One was built on Combahee Bank, South Carolina, and ten were built on the Savannah River, between the rear beacon of Ogle-

thorpe Range and Tybee Knoll Cut light-station. Three were discontinued on the Ashley River, South Carolina, and one at the mouth of Jekyl Island Creek, Brunswick Harbor, Georgia. The marks discontinued were replaced with lighted beacons. All the day marks are in good condition.

FOG-SIGNALS OPERATED BY STEAM.

728. *Frying-Pan Shoals light-vessel, No. 1, seacoast of North Carolina.*—This 12-inch steam whistle was in operation some 6.26 hours, and consumed about 1 ton of coal and part of a cord of wood.

788. *Martins Industry light-vessel, No. 53, seacoast of South Carolina.*—This 12-inch steam whistle was in operation some 43.38 hours, and consumed about 3 tons of coal and part of a cord of wood.

BUOYAGE.

The buoyage of the district is in good condition. On account of the unserviceable condition of the boiler of the tender *Wistaria*, the work of relieving the buoys was commenced earlier in the year than has been the custom heretofore. Changes were made in the buoyage at the entrance to Cape Fear River, entrance to Winyah Bay, entrance to Charleston, entrance to North Edisto, entrance to St. Helena Sound, South Carolina; entrance to Warsaw Sound, channel into St. Simon Sound, Georgia, and channel into St. Johns River, Florida. Additional buoys were established at Little River Inlet, North Carolina, at the entrance to Winyah Bay to mark the wreck of the *Housatonic*, at the entrance to Charleston and Charleston Harbor, in Beaufort River, South Carolina, and St. Simon Sound, Georgia. The buoys marking the following-named channels were discontinued: Slue Channel Frying-Pan Shoals, North Carolina, two buoys in Winyah Bay, Junction Buoy entrance to Charleston, south channel into North Edisto, South Carolina; north channel into Ossabaw Sound and Vernon River, Sea Buoy channel into St. Simon Sound, Georgia; Tenth Buoy channel into St. Johns River, Florida. Some 13 buoys were discontinued, 16 were established, the positions of 3 were verified, the positions of 11 were changed, and 8 were recovered. Repairs were made to 27 buoys. Some 9,371 pounds of chain, 183 second and third class shackles, 79 shackle and service pins, 64 links, 2 bell-buoy disks, 7 fourth-class rings, and 677 split keys were purchased.

The following-named buoys and appendages were received from the general light-house depot: Five second and 5 third class stone sinkers, 6 second and 6 third class can ballast balls, 6 pieces 1-inch chain, 10 second and 10 third class buoy swivels, 2 bell-buoy disks, 4 second-class can buoys, 28 wear plates, 25 second and 25 third class buoy shackles, and 5 fourth-class iron sinkers.

LIGHT-HOUSE DEPOTS.

— *New depot for Sixth light-house district.*—In the last annual report it was stated that it having been found impracticable to procure a suitable site within the appropriation of \$35,000 provided for the purpose of establishing this depot, the War Department had given permission for the use of old Fort Pinckney, Charleston Harbor, South Carolina, for depot purposes. Sketches and descriptions of the required structures and detailed plans and specifications were prepared. In September, 1900, proposals for furnishing all the labor and mate-

rials for the establishment of the depot were received and the lowest one was accepted. Contract was entered into, and on December 3 the contractor was directed to proceed with the work. The custodian's dwelling has been practically completed, the storehouse is nearly so, the wharf is about one-half finished, and the oil house has been begun. It is confidently expected that the whole work will be completed within contract time. There are stored here supplies for distribution to the various stations in the district, the greater portion of the buoys, buoy appendages, and light-vessel chains, together with all unserviceable property or such property as may not be in immediate use.

— *The old post-office building, Charleston, S. C.*—The plastering and plumbing needed in the conversion of this building into offices, storehouse, and lamp shop was finished and the inspector's office, the lamp shop, and all engineer property at the old lamp shop were transferred to it. The roof was painted. The building is now in good condition.

LAMP SHOP.

During August and September the lamp shop for the Sixth light-house district was moved from the rented premises, No. 93 East Bay street, Charleston, S. C., to the old post-office building, where suitable quarters had been provided for it and for the engineer property, which had up to that time been kept in a rented storehouse. Rent ceased to be paid for those premises on September 30, 1900.

LIGHT-HOUSE TENDERS.

Wistaria.—This iron side-wheel steamer was built in 1881-82, and is of about 450 tons gross burden. She replaced and relieved 343 buoys, repaired 25, recovered 8, changed and repainted 584, established 14, and discontinued 12. She repaired 128 buoy chains, put new disks in 6 bell buoys, and new chafing fenders on 4 whistling buoys. Her crew was employed 35 days on buoys at the buoy depot and at the custom-house dock, and 22 days at work repairing light ships. During each quarter she supplied the light-vessels with fuel, rations, and supplies, and transported the inspector on various inspection trips. She towed Frying-Pan Shoals light-vessel, No. 1, from her station to Charleston and back, Martins Industry Shoal light-vessel, No. 53, from her station to Charleston and back, and the relief light-vessel from Charleston to Frying-Pan Shoals and back, and from Charleston to Martins Industry Shoals and back. She steamed during the year some 12,960 miles, of which about two-thirds was at sea, and consumed about 975 tons of coal and 4 cords of wood. She was in motion 60 days, was 212 days under steam, and 153 days without fire. She had steam in her donkey boiler about 25 days. She was sent north in the latter part of June, and is now in the hands of the contractors, who are to put in a new boiler and make extensive repairs to her hull, woodwork, and machinery. During the year repairs were made to her boiler at various times, to her fire tools; and some minor repairs to her woodwork. Her naphtha launch was overhauled, repaired, and put in good condition. Mattresses were renovated. She was hauled out, her bottom was cleaned and painted, and her copper discharge pipe, scrapers, and chains were repaired. She was supplied with a new compass and azimuth circle, six chairs, new ash buckets, cushions,

rubber mats, a new mast, drawing instruments, and various miscellaneous articles of engineer supplies.

Pharos.—This wooden schooner, which was purchased in 1854, and rebuilt in 1872, is of about 168 tons gross burden. During July and August she was employed in the construction of Bull Bay light-station and repairs at Cape Romain, South Carolina, light-station. During September and October she was docked, her copper was patched, and her sides and deck were calked. She was painted outboard and inboard, and her boats and cabin furniture were repaired. Her crew assisted in moving engineer property from the old lamp shop to the new storehouse in the old post-office building. During November and December she built 10 day marks in the Savannah River, Georgia, and repaired Tybee Knoll Cut light-station and Long Island beacon. During January and February she repaired Tybee light-station, Hilton Head light-station, and Cockspur beacon. During March and April she repaired Little Cumberland and St. Johns River light-stations, and supervised the rebuilding of Skull Creek, South Carolina, beacon. During May and June she took up the submarine cable across Broad River, South Carolina, and repaired Paris Island and Hunting Island light-stations.

Water Lily.—This wooden 65-foot twin-screw naphtha launch was built in 1895, and is of about 33 tons gross burden. She steamed some 7,325 miles, and consumed about 4,478 gallons of naphtha. She was used in inspecting 84 light-stations and all the post lights and beacons in the Savannah and St. Johns rivers, in rebuilding 25, repairing 8, and repainting 28 post lights and beacons, and delivering supplies to nearly every station south of Georgetown. Her crew was used in repairing 3 station boats and 1 light-ship's boat, and rebuilding 2 landings on the St. Johns River.

Snowdrop.—This wooden naphtha launch was built in 1896, and is of 19 tons burden. During July and August she was employed in rebuilding the old post-office and Mount Pleasant range, South Carolina, and in moving the lamp shop. During September, October, November, and December she was dry docked, her engines were overhauled, and her hull was painted. Examinations were made for the Ashley River beacons, six were built, and Sullivans Island light-station, South Carolina, was repaired. During January, February, and March she was employed at the new light-house depot. During April, May, and June she made examinations for and established the new Mount Pleasant range, Charleston Harbor, and was employed on inspection of light stations. She steamed about 2,240 miles during the year, and consumed 3,407 gallons of naphtha.

WAR TELEPHONE LINES.

The telephone line between Georgetown and South Island, South Carolina, the line between Charleston and Charleston light-station, South Carolina, and the line between St. Augustine and St. Augustine light-station, Florida, are in good condition. The wire between Hilton Head light-station and the Port Royal, S. C., naval station, including 3 miles of submarine cable across Broad River, has been removed and brought to Charleston. As much as is necessary of this material will be used in connecting a telephone line between the light-house depot for the Sixth light-house district and the offices of the light-house inspector and engineer in Charleston.

SEVENTH DISTRICT.

This district extends from a point just south of Jupiter Inlet light station to and includes Perdido entrance, Florida. It embraces all to navigation on the sea and Gulf coasts of Florida, and on other waters tributary to the sea and Gulf between the limits named.

Inspector.—Commander Frederic Singer, United States Navy.

Engineer.—Lieut. Col. A. N. Damrell, Corps of Engineers, United States Army.

There are in this district—

Light-houses and lighted beacons.....	
Day or unlighted beacons.....	
Whistling buoys in position.....	
Bell buoys in position.....	
Other buoys in position.....	
Steamer <i>Laurel</i> , buoy tender, and for supply and inspection.....	
Steamer <i>Mangrove</i> , buoy tender, and for supply and inspection.....	
Steamer <i>Arbutus</i> , for construction and repair in the Seventh and Eighth districts.....	

LIGHT-STATIONS.

— *Hillsboro Inlet, off Hillsboro Point, between Jupiter Inlet Forey Rock lights, Atlantic coast of Florida.*—The following recommendation, which has been made in several previous annual reports to the Board, is renewed:

The establishment of a light at or near Hillsboro Point, Florida, would be of great assistance to all vessels navigating these waters. Steamers bound southward, making Jupiter Inlet light, hug the reef very closely to avoid the current. The dangerous reef making out from Hillsboro Inlet compels them to give it a wide berth to go out into the Gulf Stream. Vessels coming across from the Bahama Banks will be able to verify their position if a light were placed here—a difficult matter in which they fail to make Jupiter Inlet. The establishment of this light would complete the system of lights on the Florida reefs. The Board therefore renews the recommendation that \$90,000 be appropriated for this purpose.

By the act approved February 12, 1901, the establishment of a first order light at or near Hillsboro Point, Florida, was authorized at a cost not exceeding \$90,000, but no appropriation was made therefor.

937. *Carysfort Reef, on Carysfort Reef, Florida.*—New revolving machinery was installed.

941. *Cape Florida Shoal Beacon, Florida.*—This beacon was built by contract and is one of the Hawk Channel beacons. It is a square red pyramid of horizontal slats on iron-cased piles. It bears the letters C. F. in white, 12 inches high, on four sides of the base of the pyramid. It stands in 8 feet of water, near the entrance to Bay Biscay and about 60 feet to the northward of the entrance channel. It shows a fixed red lens-lantern light 30 feet above water.

942. *Bowles Bank Beacon, Florida.*—This beacon was built under contract and forms one of the Hawk Channel system. It is a square black pyramid of horizontal slats on iron-cased piles, with the white letters B. B. 12 inches high on four sides of the base of the platform. It stands in 15 feet of water, near the end of Bowles Bank, where

course in Hawk Channel changes from S. by W. $\frac{1}{4}$ W. to S. $\frac{3}{4}$ E., and can be passed close to on either hand. It shows a fixed white lens-lantern light 30 feet above water.

944. *Basin Hill Beacon, Florida*.—This beacon was built under contract and forms one of the Hawk Channel system. Since its completion another location has been selected and it is to be taken up and moved. It does not yet bear a light, but will do so after its removal to a new site. It is a black, square pyramid of horizontal slats on iron-cased piles, with the white letters B. H. 12 inches high on four sides of the base of the platform. It stands in about 11 feet of water about three-fourths mile offshore from mid-channel buoy.

945. *Mosquito Bank Beacon, Florida*.—This beacon was built under contract and forms one of the Hawk Channel system. It is a square, black pyramid of horizontal slats on iron-cased piles, with the white letters M. B. 12 inches high on four sides of the base of the platform, and shows a fixed white lens-lantern light 30 feet above mean high water. It stands in 11 feet of water, near 7-foot rock head, and should be left one-fourth mile on the port hand in running Hawk Channel from Miami to Key West.

946. *Hen and Chickens Shoal Beacon, Florida*.—This beacon was carried away by a storm on September 5, 1900, and was rebuilt without change of location in December, 1900. It is a square, red pyramid of horizontal slats on two iron-cased piles and two cased in terra cotta pipe; it bears a red lens-lantern light 30 feet above water, and has the white letters H. & C. 12 inches high painted on four sides of the base of the platform.

950. *Bahia Honda Beacon, Florida*.—This beacon was built under contract and served to mark the entrance to Bahia Honda, a harbor of refuge making in from Hawk Channel. It was blown down by the storm of September 5, 1900, and bids for the work of rebuilding it were called for by advertisement, but none were received. The work is now being readvertised with a view to rebuilding the structure by contract.

952. *Pelican Key, Beacon, Florida*.—This beacon was built under contract and forms one of the Hawk Channel system. It is a square, black pyramid of horizontal slats on iron-cased piles and with the letters P. K. 12 inches high in white on four sides of the base of the platform. It is to show a fixed white lens-lantern light 30 feet above mean high water. It stands in 17 feet of water on an 11-foot shoal near the horizontal striped buoy off Pelican Key, Fla.

954. *Key West, Gulf of Mexico, Florida*.—The light tower was scaled, scraped, and painted three coats from the lantern down. The oil house was made 2 feet wider and received a new roof. One cistern was repaired.

956. *Key West (rear) Beacon, Florida*.—This light, which formerly rested on the peak of the buoy shed roof, was raised 10 feet and now rests on a square, pyramidal wooden structure constructed on the peak of the buoy shed. This structure supports a strong platform and is equipped with a ladder, a derrick for hoisting the lantern to place, and a lamp house on which to trim and fill the lantern. It is painted mineral brown on three sides and black with a central vertical white stripe on the fourth side facing the channel.

957. *Middle Ground Shoal Beacon, Key West Harbor, Florida*.—A square beacon was to have been erected in about 16 feet of water on

the Middle Ground of Northwest Passage, and the materials left over from the erection of other beacons in Hawk Channel by contract were to be used in the work. After Hen and Chickens beacon was carried away by storm it was considered urgently necessary that it should be rebuilt, and the materials were therefore used in its reconstruction. Bids for the construction of the Middle Ground beacon are now being asked for by advertisement.

959. *Northwest Bar Beacon, Florida.*—This beacon is a square, red pyramid of horizontal slats on iron-cased piles, in 16 feet of water, at the turning point in Northwest Channel into Key West Harbor, Fla. It bears a fixed red lens-lantern light 33 feet above mean high water.

— *Cape Romano, on the island forming that cape, about 33 miles southeast from Sanibel Island, Florida.*—The Gulf coast of Florida between Sanibel Island and Key West, something over 100 miles, is without a single light. There is quite a large commerce carried on between Florida ports above Sanibel Island and Key West and Cuba, using the route along the west coast of Florida, and a light at Cape Romano would be of great benefit. The island forming the cape was reserved for light-house purposes by the Executive order dated January 9, 1878. The Secretary of the Treasury in his letter to the honorable Speaker of the House of Representatives recommended, at the instance of the Light-House Board, that an appropriation of \$35,000 be made for the erection of a second-order light at this point, and the Board renews the recommendation.

963. *Big Marco Pass (front) Beacon, Florida.*—This beacon is a triangular, black pyramid of horizontal slats on iron-cased piles, in 3 feet of water, on the port side of the entrance to Big Marco Pass, Florida. It will show a fixed red lens-lantern light 35 feet above mean high water.

964. *Big Marco Pass (rear) Beacon, Florida.*—This beacon is a triangular, black pyramid of horizontal slats on iron-cased piles, in 3 feet of water, on the port side of the entrance to Big Marco Pass, Florida, and one-fourth mile NE. $\frac{1}{4}$ E., in the rear of the front beacon, with which it forms a range for running the entrance channel. It will show a fixed white lens-lantern light 50 feet above mean high water.

973. *Point Pinelos Beacon, Tampa Bay, Florida.*—This beacon was formerly a day mark. It was thoroughly repaired and now shows a fixed white lens-lantern light 31 feet above mean high water.

974. *Indian Hill Beacon, Tampa Bay, Florida.*—The pole supporting the light was taken down, the platform was removed, and new sills were put on; the platform was renewed and the lantern post was replaced. A lamp house was fastened to the platform. Various repairs were made.

981. *Snead Point Shoal Beacon, Tampa Bay, Florida.*—A set of hoisting apparatus was put up and the light was arranged so that it could be raised and lowered.

982. *Manatee River Cut Beacon, Tampa Bay, Florida.*—A set of hoisting apparatus was put up and the light arranged so that it could be raised and lowered.

983. *Terraceia Point Beacon, Florida.*—This beacon was changed from a day to a lighted beacon by driving two additional piles, putting on a triangular platform, and a hoisting gear for the lens lantern, lamp house, and ladder. The entire structure was painted. It now shows a fixed white lens-lantern light 20 feet above water. It has the figure 1 in white on the easterly and westerly sides.

984. *Bird Key Beacon, Terraceia Bay, Florida.*—This beacon was formerly a day mark and was arranged to show a light by the addition of two piles, a triangular platform, and the installation of hoisting gear, ladder, and lamp house. When the installation of the light on the structure was attempted, it was found that the beacon had been run into and damaged. It was repaired by pulling it back into position, renewing the braces, and repairing the hoisting gear. The light was installed on June 29, 1901.

992. *Crooked River (rear) St. George Sound, Florida.*—The revolving machinery was repaired and arranged to run sixteen hours without rewinding. Various repairs were made.

993. *Six-Foot Spot Beacon, in 6 feet of water, in the westerly end of St. George Sound, Florida.*—A 5-day lens lantern was installed. Various repairs were made.

994. *Porter Bar Beacon, on the southerly point of Porter Bar, westerly end of St. George Sound, Florida.*—A 5-day lens lantern was installed. Minor repairs were made.

995. *Bulkhead Cut (front) Beacon, Apalachicola Bay, Florida.*—A 5-day lens lantern was installed. Minor repairs were made.

996. *Bulkhead Cut (rear) Beacon, Apalachicola Bay, Florida.*—A 5-day lens lantern was installed. Minor repairs were made.

997. *Outer Beacon, Apalachicola Bay, Florida.*—A set of hoisting gear was put up and arranged so that the lantern could be hoisted and lowered. A ladder was placed.

1000. *Cape St. George, near the westerly end of St. George Island, Florida.*—Some 32 feet of wharf was built at the inner end of the old wharf. It is 8 feet wide and rests on piles covered with yellow metal from a foot below the ground to a foot above mean high water. Three ladders were made and put in place on the T-head. Some 132 feet of plank walk was built between the keeper's dwelling and the tower, 100 feet between the assistant keeper's dwelling and the tower, and 70 feet around the assistant keeper's dwelling. Various repairs were made.

1001, 1002. *St. Vincent Bar Beacon, in 4 feet of water on edge of St. Vincent Bar, Florida.*—This beacon has never been lighted. Arrangements have been made to take it up and remove it to a new site.

1003. *Cape San Blas, Gulf of Mexico, Florida.*—New shingle roofs were put on the two temporary dwellings. Some 250 feet of plank walk, 5 feet wide, was built between the dwellings and the tower. The tower was scaled, scraped, and painted two coats of brown metallic paint. Various repairs were made. Nothing has yet been done with the special appropriation of \$15,000 made by the act approved June 6, 1900. The advisability of removing the station to a new site is being considered, or of building permanent keepers' dwellings in place of the present temporary buildings, and repairing the present light tower and permitting it to remain in the old location. The point of land on which the tower stands has made out until the beach at the nearest point is 1,000 feet or more distant from the tower. As this movement is increasing it may become necessary to move the structures of the station to a new site.

1004. *St. Joseph Point, in St. Joseph Bay, Florida.*—A thorough investigation showed that the peninsula would not be a suitable site for this light, and its erection on the mainland was decided upon and a site was secured. Plans and specifications were prepared, bids were asked

by advertisement, and six were received. All were too high. The building of the station by hired labor is under consideration.

1005. *St. Andrews Bar (front) Beacon, Florida.*—A red 5-day lens-lantern light was installed on this structure.

1006. *St. Andrews Bar (rear) Beacon, Florida.*—A white 5-day lens-lantern light was installed on this structure.

1007. *St. Andrews Bay (front) Beacon, Florida.*—A red 5-day lens-lantern light was established on this structure.

1008. *St. Andrews Bay (rear) Beacon, Florida.*—A white 5-day lens-lantern light was established on this structure.

1009. *East Pass of Choctawhatchee Bay (front) Beacon, Florida.*—This is a brown single-pile wooden beacon, with crosshead equipped with hoisting gear, and with a latticework ball, or basket, just under the crosshead, to serve as a day mark. It is 35 feet 7 inches high above mean high water, and will show a red lens-lantern light. It stands on the beach 220 feet from high-water mark, and, with the rear beacon of the range, will serve as a guide for crossing the bar at the entrance to East Pass of Choctawhatchee Bay from the Gulf of Mexico.

1010. *East Pass of Choctawhatchee Bay (rear) Beacon, Florida.*—This is a brown single-pile wooden beacon, with a crosshead equipped with hoisting gear, and with a latticework basket, or ball, just under the crosshead, to serve as a day mark. It is located on a bluff 260 feet N. N. E. $\frac{1}{4}$ E., in rear of the front beacon of this range, and will show a white lens-lantern light 54 feet above water.

— *Choctawhatchee Bay (front) Beacon, Florida.*—The lantern was removed. This beacon will be taken down and rebuilt at another site.

— *Choctawhatchee Bay (rear) Beacon, Florida.*—The lantern was removed. This beacon will be removed to another site and rebuilt.

1011. *Santa Rosa Sound (front) Beacon, Florida.*—This beacon was built by contract. It is a triangular pyramid of horizontal slats on iron-cased piles and bears a red lens-lantern light 36 feet 6 inches above mean high water. It stands in 4 feet of water at the eastern end of Santa Rosa Sound, and with the rear beacon forms a range for running the bar between Choctawhatchee Bay and Santa Rosa Sound. The structure is painted white. In a gale the upper part of the beacon was carried away, but the damage was repaired and the light was reestablished.

1012. *Santa Rosa Sound (rear) Beacon, Florida.*—This beacon was built by contract. It is a red triangular pyramid of horizontal slats on iron-cased piles, surmounted by a white lens-lantern light 51 feet 6 inches above mean high water. It stands in 4 feet of water at the eastern end of Santa Rosa Sound and about one-half mile westward of the front beacon of the range.

1013. *Deer Point Beacon, off Deer Point, near Quarantine Station, Pensacola Bay, Florida.*—This beacon was built by contract. It is a black, triangular pyramid of horizontal slats on iron-cased piles, and shows a white lens-lantern light 50 feet 6 inches above mean high water. It stands in 4 feet of water off Deer Point and near the Quarantine Station, Pensacola Bay, Florida.

1014. *Pensacola, Gulf coast of Florida, westerly end of Pensacola Bay, near Fort Barrancas, Florida.*—An effort was made to repair this station by contract, but the bids received, being excessive, were rejected, and the work is being done by hired labor. The material was delivered and the repairs were commenced late in June.

1016. Caucus Cut (front) Beacon, Florida.—This beacon was built by contract. It is a triangular black pyramid of horizontal slats on iron-cased piles, and shows a white lens-lantern light 36 feet 6 inches above mean high water. It stands in 9 feet of water, just north of the ruins of Fort McRee breakwater, and with the rear beacon forms a range for running the Caucus Cut Channel, at the entrance to Pensacola Bay, Florida. Minor repairs were made.

1017. Caucus Cut (rear) Beacon, Florida.—This beacon was built by contract. It is a triangular red pyramid of horizontal slats on iron-cased piles, and bears a white lens-lantern light 52 feet 6 inches above mean high water. It is located on the beach about nine-sixteenths of a mile NNW. from the front beacon of this range.

1018. Fort McRee (front) Range Beacon, Florida.—This beacon was taken down, removed 9 feet to westward, and rebuilt on a new foundation. It was furnished with a red lens-lantern light. Materials have been delivered for a second-order brick oil house.

1019. Fort McRee (rear), in the lagoon in the rear of the front range beacon, Florida.—A new pyramid was built on this beacon, raising the focal plane 7 feet. It was equipped with a new set of hoisting gear and fitted with a fixed white lens-lantern light.

1020. Fort Barrancas (front) Beacon, on the beach near Fort Barrancas, Florida.—This beacon was taken down and rebuilt on a new foundation, 9 feet to the westward of its former position. The color of the light was changed from white to red and a new lens lantern installed on the structure. It was also equipped with a complete new set of hoisting gear.

1021. Fort Barrancas (rear) Beacon, on the bluff near Fort Barrancas, Florida.—The beacon was painted and furnished with a complete set of new hoisting gear. The color of the light was changed from red to white and its power was increased from a post to a lens lantern.

1022. Devils Point Beacon, west side of Escambia Bay, Florida.—The pyramid was changed, the beacon was equipped with a complete set of new hoisting gear, and a lens lantern was substituted for the post lantern.

1023. White Point, upper part of Pensacola Bay, Florida.—A new pyramid was built on this beacon and it was thoroughly repaired in other respects. New hoisting gear was put on it. The color of the light was changed from red to white and its power was increased from a post to a lens lantern.

1024. Middle Beacon, East Bay, upper part of Pensacola Bay, Florida.—New piles were driven and bolted to the old ones. The pyramid was built and the structure painted. It was equipped with a new set of hoisting gear and with a red lens-lantern light.

1025. Escribano Point, Pensacola Bay, Florida.—This beacon was repaired and painted. The pyramid was changed and new hoisting gear was installed. The color of the light was changed and a lens lantern installed on it in place of the post lantern.

Reimbursement of a light-keeper for losses sustained during the gale of October, 1894.—The following recommendation, which was made in the Board's last two annual reports, is renewed:

It appears that Mr. W. M. Quinn, while keeper of Cape San Blas, Florida, light-station, during the gale of October, 1894, lost all the property he had at the light-station. An itemized account, amounting to \$124.75, was transmitted through the inspector of the light-house district, who recommends that the keeper be indemnified in the sum claimed by him. The Board therefore recommends that an appropriation of \$124.75 be made for this purpose.

Reimbursement of George L. Long, assistant keeper of Cape San Blas light-house, Florida, for losses sustained during the hurricane of October 8, 1894.—The following recommendation, made in the Board's last annual report, is renewed:

A statement of the losses sustained by this assistant keeper, to the amount of \$75, approved and recommended by the inspector of the Seventh light-house district, was sent by the Secretary of the Treasury to the Speaker of the House of Representatives in his letter of April 20, 1900, with recommendation that reimbursement be made. The Board recommends that an appropriation of this amount be made therefor.

REPAIRS.

Repairs, more or less extensive, were made at the following-named stations:

960. Rebecca Shoal, Fla.	980. Barrel Stake Beacon, Fla.
971. Egmont Key, Fla.	988. St. Marks, Fla.
975. South Cut (lower) Beacon, Fla.	998. Apalachicola Bay (front) Beacon, Fla.
977. North Cut (lower) Beacon, Fla.	999. Apalachicola Bay (rear) Beacon, Fla.
979. Middle Ground Beacon, Fla.	

DAY OR UNLIGHTED BEACONS.

These are generally in good condition. Some 24 numbered or lettered iron spindle beacons along the Florida reefs and Key West were scaled, scraped, and the cages, frames, letters or figures, and spindles were painted white and the sockets black. Two beacons in Tampa Bay, Catfish Shoal Point, and wreck of steamer *Cool* were scraped and painted by the crew of the tender *Mangrove*, and Porter Bar day beacon in St. George Sound by the crew of the tender *Laurel*. By the discontinuance of the lights the two range beacons in Choctawhatchee Bay became day beacons. The following-named 9 were built: Soldier Key, Baches Shoal, Margot Fish Shoal, Old Rhodes Bank, Triangles, Indian Key, Jacobs Harbor Heads, Loggerhead Key, all in Hawk Channel, Florida, and Eastern Triangle, main ship channel to Key West, Fla. Two signal pile beacons are to be established in St. George Sound, Florida; Carrabelle River outer beacon, to mark the outer end of the cut through Carrabelle River bar, and Lower Bulkhead day beacon, to mark the point of entering or leaving the southerly end of Bulkhead cut. Day beacon No. 4, west end of middle ground, south channel from Old Tampa Bay, was run into and carried away.

Baches Shoal Beacon, Hawk Channel, Florida.—This beacon was built by contract. It is a square black pyramid of horizontal slats on iron-cased piles. It is equipped with a landing ladder, lamp house, and hoisting gear for the installation of a light should it be deemed advisable. It stands in 16 feet of water on the south end of Baches Shoal.

Margot Fish Shoal Beacon, Florida.—This beacon was built by contract. It is a square red pyramid of horizontal slats on iron-cased piles. It is furnished with landing ladder, a lamp house, and hoisting gear for the installation of a light should it be deemed advisable. It stands in 11 feet of water east of Margot Fish Shoal, Hawk Channel, Florida.

Old Rhodes Bank Beacon, Florida.—This beacon was built by contract. It is a square red pyramid of horizontal slats on iron-cased piles.

It is furnished with a landing ladder, lamp house, and hoisting gear for the installation of a light should it be deemed advisable. It stands in 12 feet of water on Rhodes Bank inshore of buoy No. 8, on the point of the bank.

Mosquito Bank Beacon, Florida.—This beacon was built by contract. It is a square black pyramid of horizontal slats on iron-cased piles. It is furnished with a landing ladder, lamp house, and hoisting gear for the installation of a light should it be deemed advisable. It stands in 10 feet of water near $\frac{1}{4}$ -foot shoal about one-fourth mile from buoy No. 7, Hawk Channel.

Triangles Beacon, Florida.—This beacon was built by contract. It is a red square pyramid of horizontal slats on iron-cased piles. It is equipped with a landing ladder, lamp house, and hoisting gear for the installation of a light should it be deemed advisable. It stands in 17 feet of water near western end of Triangles Shoals, Hawk Channel.

Indian Key Beacon, Florida.—This beacon was built by contract. It is a red square pyramid of horizontal slats on iron-cased piles. It is equipped with a landing ladder, lamp house, and hoisting gear for the installation of a light should it be deemed advisable. It stands in $11\frac{1}{2}$ feet of water $1\frac{1}{4}$ miles E. $\frac{1}{4}$ S. from Indian Key, Hawk Channel, Florida.

Jacobs Harbor Heads Beacon, Florida.—This beacon was built by contract. It is a red square pyramid of horizontal slats on iron piles. It is equipped with a landing ladder, lamp house, and hoisting gear for the installation of a light should it become necessary. It stands in 26 feet of water near 7-foot shoal, Hawk Channel, Florida.

Loggerhead Key Beacon, Florida.—This beacon was built by contract. It is a red square pyramid of horizontal slats on iron-cased piles. It is equipped with a landing ladder, lamp house, and hoisting gear for the installation of a light should it be deemed advisable. It stands in 23 feet of water off Loggerhead Key, Hawk Channel, Florida.

Soldier Key Beacon, Florida.—This beacon was built by contract. It is a black square pyramid of horizontal slats on iron-cased piles. It is furnished with a landing ladder, lamp house, and hoisting gear for installing a light should it be deemed advisable. It stands in 11 feet of water outside of Coral Bunches near Soldier Key, Hawk Channel, Florida.

Eastern Triangles Beacon, Florida.—This beacon was built by contract. It is a red square pyramid of horizontal slats on iron-cased piles. It is furnished with a landing ladder, lamp house, and hoisting gear for the installation of a light should it be deemed advisable. It stands in 20 feet of water near a 16-foot spot about opposite Western Triangles buoy, Hawk Channel, Florida.

Terraccia Bay Beacon, No. 5.—This beacon was struck by lightning and badly damaged. It was repaired and is again in good condition.

East Pass of Choctawhatchee Bay beacons, Florida—Big Marco Pass beacons, Florida.—These four beacons are still unlighted and serve as day marks, but it is expected that lanterns will be installed on them at an early date.

BUOYAGE.

On account of the absence of the tender *Laurel* and repairs to the tender *Mangrove* the buoy work of the district fell behind and is not yet in proper condition. As each tender became available the work of

relieving the buoys was pushed and many buoys received but one or two coats of paint before going into the water. At the end of the year work had progressed so that there is not a single buoy that has been in position for over a year. During the year six third-class nun buoys and three second-class can buoys were received. Four buoys were established as follows: Boca Grande Bar buoy, No. 1, a black second-class can to mark the northwesterly end of the bar in Boca Grande Channel to Key West, Fla.; East Seventeen-Foot Shoal buoy, a second-class nun, red and black horizontal stripes, to mark the shoal at the head of the narrows, Tampa Bay, Florida; Seventeen-Foot Shoal buoy, a second-class can, red and black horizontal stripes, to the westward of this shoal, was renamed West Seventeen Shoal buoy; Bowles Bank buoy, No. 4, a red third-class nun in 10 feet of water on the channel side of an 8-foot shoal in Hawk Channel, Florida; Bulkhead buoy, No. 6, a red third-class nun buoy, to mark the northerly end of the dredged cut through Bulkhead, St. George Sound, Florida. The following-named buoys in Hawk Channel, Florida, were discontinued and replaced by beacons: North of Bowles Bank buoy, P. S. second-class nun buoy; Bache Shoal buoy, No. 3, third-class can buoy; Margot Fish Shoal buoy, No. 4, second-class nun buoy; Old Rhodes Bank buoy, No. 8, second-class nun buoy; Four-Foot Shoal Mosquito Bank buoy, No. 7, second-class can buoy; West End of Triangle buoy, No. 9, second-class can buoy; Seven-Foot Shoal Jacobs Harbor Heads buoy, No. 14, second-class can buoy; Loggerhead Key Bank buoy, No. 16, second-class nun buoy; Eleven-Foot Shoal buoy, H. S. second-class nun buoy; Wreck buoy, H. S. third-class nun buoy; Coral Bunches buoy, No. 1, second-class can buoy. Other buoys discontinued were: Eastern Triangle buoy, No. 4, second-class nun buoy, also replaced by a beacon, Main Ship Channel into Key West, Fla.; Bulkhead buoy, No. 6, a red third-class nun, established in another position; Snead Bar buoy, No. 4, a red third-class nun, near Bulkhead, St. George Sound, Florida; North Narrows buoy, Tampa Bay, Florida, a red third-class nun; and the seven buoys marking anchorage for heavy-draft vessels off Key West, Fla., put down during the war with Spain. Ten buoys were lost; all were replaced as quickly as possible, and those that were lost were recovered later.

LIGHT-HOUSE DEPOTS.

Key West, Gulf of Mexico, Florida.—On April 23, 1901, a depot keeper was appointed, and he has succeeded in getting the stores into order. In addition he has repaired three light-station sailboats, made three suits of boat sails, and painted 78 buoys. The storeroom was shelved, the stores were assorted and arranged, the water tanks were painted, and 10 new panes of glass were replaced in the roof of the buoy shed; minor repairs were made in the tenders. The blacksmith shop is in good condition, and in it good work was done, much of it in the way of minor repairs. The terra-cotta sleeves and cement surrounding the supporting piles under the wharf were found to be in bad condition in many places. Materials were bought and delivered and 131 sections of terra-cotta pipe were renewed and filled with cement mortar. Many other sections of pipe were filled with mortar where they had worked loose. The coal shed is in good condition. About 200 tons of coal are stored there, to be used in case of emer-

gency. The storehouse, years ago used as quarters for the inspector, is used for the storage of oil.

Egmont Key, entrance to Tampa Bay, Florida.—The buoy shed is in good condition. Five clusters of four piles each were driven in front of the coal and buoy wharf and their heads bound together with chain. All of the materials stored in the buoy shed were assorted and straightened up.

Pensacola depot and blacksmith shop, Warrington Navy-Yard, Pensacola Bay, Florida.—The Navy Department having objected to the present location of the buoy depot and blacksmith shop, and requested its removal, arrangements are being made to secure another suitable site in the vicinity with the view of building a new depot, shop, and wharf.

LIGHT-HOUSE TENDERS.

Mangrove.—This steel twin-screw steamer was built in 1897 and has a displacement of 600 tons. She was used for buoyage, inspection work, and for supplying rations. The vessel was docked on December 18, 1900, at Mobile, Ala., the bottom was cleaned by the crew and painted with anticorrosive and antifouling paints, and repairs were made to her hull and machinery. The repairs were finished and she left Mobile on February 20, 1901, the district being without her services for two months. Her crew cleaned and painted 79 buoys, changed 79 buoys, and worked 25½ days at the depot. The *Mangrove* steamed some 8,722 nautical miles and consumed about 1,038 tons of bituminous coal.

Laurel.—This wooden twin-screw steamer of 312 tons gross was built in 1876. She was employed in relieving buoyage in the district until September 24, 1900, when the vessel was hauled out. Repairs were made to her hull, spars, boiler, and machinery, and completed October 18, 1900. On November 3, 1900, the *Laurel* left for Porto Rico. When but a short distance from Key West the Kingston valve cracked, and as the vessel was leaking badly she put back to Key West. When the valve was repaired the *Laurel* again started for Porto Rico and arrived there on November 28, 1900. She left Porto Rico for Key West on March 1, 1901, via Puerta Plata, where she had been sent to recover a first-class nun buoy belonging to the Light-House Establishment, and arrived in Key West on March 8, 1901. During her service in Porto Rican waters the *Laurel* was employed in inspection and supplying stations for 32 days, on buoy work 22 days, and cleaning and painting ship 19 days. Since her return she has been constantly employed in buoy work and delivery of rations and supplies. The vessel steamed 7,964 nautical miles and consumed 533 tons of bituminous coal. She relieved 162 buoys, cleaned and painted 162 buoys, and worked 29 days at the depot.

Arbutus.—This wooden twin-screw steamer was built in 1879 and is of 400 tons gross burden. She was engaged during a part of the year in delivering materials and assisting in repairs to light-stations. She delivered materials and assisted in the work of scaling and painting the iron spindle beacons on Florida Reefs, painting initials on Hawk Channel beacons, in the erection of Northwest Bar and Hen and Chickens Shoal beacons, in the driving of fender piles at Egmont Key Depot wharf, the erection of hoisting gear on Point Pinelos beacon, the

delivery of materials for an oil house at Fort McRee light-station, and for repairs to Pensacola light-station, and in repairing and changing Escribano Point, Devils Point, White Point, Middle beacon, Fort McRee Range beacons, and Fort Barrancas Range beacons. She also delivered materials for constructing Key West Main Ship Channel rear beacon, for repairs to Cape San Blas light-station, and for the new roof on Rebecca Shoal light-station. She assisted in a survey of the old Cape Florida Reservation and made a trip of inspection to Pensacola and Cape San Blas. The number of miles steamed and number of tons consumed will be given in the report for the Eighth district.

New tender for engineer Seventh light-house district.—The act of Congress approved March 3, 1901, made an appropriation of \$85,000 for a new steam tender. Plans and specifications for the new vessel are under consideration.

HIRED VESSELS.

Cleopatra.—This wooden schooner was employed until August 20, 1900, when she was discharged. She delivered materials and assisted in repairs to beacons in Tampa Bay. She changed two beacons in Terraceia Bay from day to lighted structures and made slight repairs at Egmont Key light-station.

Wanderer.—This wooden schooner was hired until June 20, 1901, when she was discharged. She was employed part of the time in the Seventh district. She relieved the tender *Arbutus* and assisted in the work of repairing and changing beacons in Pensacola Bay and at forts McRee and Barrancas. She delivered materials at Cape St. George, Crooked River, and St. Marks light-stations, delivered materials and assisted in the work of building range beacons at Big Marco Pass, and in repairs to Indian Hill and Bird Key beacons, and to the hoisting gear on Snead Point Shoal and Manatee River Cut beacons, Tampa Bay, Florida.

EIGHTH DISTRICT.

The district extends from but does not include Perdido Entrance, to the southern boundary of Texas. It embraces all aids to navigation on the Gulf coast of the United States and tidal waters adjacent to the Gulf between the limits named, together with those on the Mississippi River below New Orleans and on Grand Lake and Lake Chicot.

Director.—Commander J. R. Selfridge, United States Navy, to April 1, 1901; Lieut. Commander A. C. Dillingham, United States Navy, from April 17, 1901; Commander Kossuth Niles, United States Navy, from April 17, 1901.

Engineer.—Lieut. Col. A. N. Damrell, Corps of Engineers, United States Army.

The aids district there are—

Lighthouses and beacon lights, including 28 post lights on the Mississippi River, Grand Lake, and Lake Chicot.....	111
Beacons in position.....	2
Unlighted beacons.....	61
Beacons operated by steam.....	1
Beacons operated by clockwork.....	13
Lighted buoys in position.....	4
Lighted buoys in position.....	5
Lighted buoys in position.....	3
Lighted buoys in position.....	124
Lighted buoys in position.....	1
Lighted buoys in position.....	1
Lighted buoys in position.....	1

LIGHT-STATIONS.

1. *Sand Island, off Mobile Point, Gulf of Mexico, Alabama.*—Repairs were made for repairing the cistern. The act approved March 6, 1900, appropriated \$65,000 for rebuilding this light-station made necessary by the encroachment of the sea. This continues to arise.

2 to 1042, 1044 and 1046 to 1048. *Mobile Ship Channel lights, Alabama.*—New hoisting gear was installed on all the beacons. Additional piles were driven, two clusters at each square beacon on the opposite the channel, and one new cluster on the triangular beacons. All were furnished with ladders. The work of scaling and painting the ironwork was commenced. Beacons Nos. 22, 7, 5, 20, 18, were scaled and received one coat of paint. Some ten additional beacons to bear oil lanterns are to be built and plans and specifications therefor are being prepared.

3. *Choctawhatchee Channel rear beacon, No. 3.*—Foundation piles were driven and old piles were bolted to them. The upper work was removed and a square pyramid of horizontal slats was put up, raising the focal plane of the light 15 feet. It was furnished with hoisting gear, two ladders, and it was painted.

1050. *Horn Island, on east end of Horn Island, Mississippi.*—This station was removed to a point 253 feet N. $\frac{1}{4}$ W. of its former location and reestablished in about 2 feet of water on 17 foundation piles protected by terra-cotta pipe filled with cement mortar. The two cisterns were placed on foundations of 8 piles under the dwelling. Steps were built leading down to a new wharf, connecting with the old wharf. The platform under the dwelling is fastened to the foundation piles. Various repairs were made.

1052. *Round Island South Spit Beacon, Mississippi.*—A lighted beacon is to be built by contract near the southwest spit of Round Island near buoy No. 8.

1054. *Pascagoula River (front) Beacon, Mississippi.*—The top of this beacon is to be changed, new hoisting gear is to be installed, and the illuminating apparatus is to be changed from a post to a lens lantern. The work is to be done by contract.

1055. *Pascagoula River (rear) Beacon, Mississippi.*—The top of this beacon is to be changed. It is to be equipped with new hoisting gear, and to have a lens lantern instead of a post lantern light. The work is to be done by contract.

1057. *Ship Island, Mississippi.*—A small jetty was built between the old light-tower and the shore, where the sea had cut in a distance of 50 feet. It is 7 feet at the base and $2\frac{1}{2}$ feet high, and is built of bricks from the ruins of the old tower. Some 125 feet of wharf was repaired. A new T-head was built at the end of the wharf. Various repairs were made.

— *Pearl River, on the east bank of the river, about seven-eighths of a mile below the railroad bridge, Mississippi Sound, Mississippi.*—The following recommendation, made in the Board's last seven annual reports, is renewed:

An appropriation of \$250 was made by the act approved on March 2, 1889, for the establishment of a light at this point. Continuous but unsuccessful effort has been made to obtain title to a site on which a proper structure could be erected. The difficulty is that the owner can not give such a title as the Government can accept. The legal costs of condemning a site would probably exceed the appropriation. The Board therefore recommends that Pearl River be included in the general appropriation for lighting rivers, when under its provisions a site for the light can be leased and the light can then at once be established.

1060, 1061, 1062, and 1063. *Biloxi Harbor beacons, Mississippi.*—Four triangular wooden beacons painted red, the upper part horizontal slats resting on iron-cased piles and bearing red lights 35 feet above water were built by contract. They stand near the easterly edge of the channel into Biloxi Harbor, and have the letters A, B, C, and D painted on them, respectively, in white, on three sides of the base of the platforms. They mark the bends in the dredged channel.

1065. *Cat Island, Mississippi.*—The work of placing ballast rock around the foundation of this light, which was started in the last fiscal year, was completed. Some 455 tons of rock were placed. It is piled 5 feet high under the structure around the foundation, which gradually slopes out.

1067. *Lake Borgne, near Lower Point Clear, Mississippi.*—Some twenty-one pine piles were driven under the wharf and coppered from 2 feet below the bottom to 2 feet above mean high water. Various repairs were made.

1070. *Point aux Herbes, easterly end of Lake Pontchartrain, Louisiana.*—Repairs to the wooden breakwater were completed. A wing

was built on each end 5 feet high by 30 feet long. Contract was made for placing 1,000 tons of rock, and 306 tons have been put in place. A combination boat and store house was built. A platform was built adjoining the keeper's dwelling. Various repairs were made.

1074. *Bayou St. John, at entrance to Bayou St. John from Lake Pontchartrain, Louisiana.*—A new cistern was erected and connections made to the gutters and with the house. The iron beacon was thoroughly overhauled and repaired and the entire structure scaled and painted. A second-order oil house was built. A plank walk was laid from the oil house to the main walk. Various repairs were made.

1075. *New Canal, at the entrance to New Canal, southerly side of Lake Pontchartrain, Louisiana.*—A new cistern was put up and connected with the gutters and dwelling. A plank walk was built from the storehouse to the dwelling. A covered way was built from the dwelling to the fog-bell tower. It is 6 feet wide, 26 feet long, and has a 7-foot story. Various repairs were made.

1077. *Pass Manchac, at the mouth of Pass Manchac, between Lakes Maurepas and Pontchartrain, Louisiana.*—On account of continuous damage resulting to the breakwater at this station from rough weather, it was decided to put rock protection around it, and a contract was made for 900 tons. None of the rock was delivered up to the end of the year. Various repairs were made.

1080. *Pass a Loutre, northerly side of the mouth of Pass a Loutre, entrance to the Mississippi River, Louisiana.*—An effort was made to repair this station by contract, but the bids received were considered excessive and were rejected. The materials for making repairs were purchased and delivered, and work was commenced late in June.

1090. *Cubits Gap light and fog-signal, Mississippi River, below New Orleans, Louisiana.*—Minor repairs were made.

The following recommendation, made in the Board's last four annual reports, is renewed:

The keeper is now living in a rented building, which is barely habitable, and is the only one available. A keeper's dwelling seems to be urgently needed. It is estimated that a suitable structure can be erected for not exceeding \$2,500, and it is recommended that an appropriation of this amount be made therefor.

1111. *Barataria Bay, easterly side of entrance to Barataria Bay, Louisiana.*—A cistern was erected. A new picket fence, with three gates in it, was put up, filling was wheeled in, and a space 116 feet by 386 feet filled to a depth of about 18 inches, after which it was sodded. Some 200 feet of plank walks were built. New boat ways were built. Various repairs were made.

— *Oyster Bayou, Gulf of Mexico, Louisiana.*—The following recommendation, made in the Board's annual reports for 1894, 1897, 1898, 1899, and 1900, is renewed:

This bayou opens into the Gulf of Mexico, and is the entrance island for all small craft engaged in the oyster, fish, and other industries. The vessels, something over 300 in number, supplying the four oyster packers at Morgan City, pass through Oyster Bayou. Vessels frequently attempt to make the bayou at night, and, lacking a light to indicate the entrance, sometimes sail 5 or 6 miles beyond it before discovering their mistake. It is therefore proposed that a light-house be placed here. Oyster Bayou is a recognized inside channel. If vessels did not pass through it, they would have to go around Pointe au Fer and the Southwest Reef light-house to reach Morgan City, thus taking an outside route very dangerous for small vessels. The mouth of the bayou is exposed to the severe storms of the Gulf, which, at times,

bank the water up to a height of 6 or 7 feet above the ordinary level and sweep over the place in violent waves. Hence it will be necessary to place the light-house on iron piles in order to raise it above the reach of storm waves. The station should be established on the point formerly occupied by the private light maintained there by certain oyster packers of Morgan City. It should consist of a keeper's dwelling from the top of which should be shown a white light from a lens lantern. It is estimated that this could be built at a cost not to exceed \$5,000. Recommendation is made that an appropriation of this amount be made therefor.

1113. Ship Shoal, on Ship Shoal, Gulf of Mexico, Louisiana.—The metal work for use in repairing this station was purchased under contract, delivered in March, 1901, and much of the work was completed. The tower was scaled and painted from the dome down to the third section below the parapet.

1125. Mermentau River, Gulf of Mexico, Louisiana.—Action under the special appropriation of \$7,000 made by act approved on July 1, 1898, for building a light here, was deferred pending the dredging of a channel at the mouth of the river.

1126. Calcasieu, entrance to Calcasieu River, Louisiana.—An effort was made to repair this station under contract, but the bids received were considered excessive and were rejected, and the work was done by hired labor. Some 720 feet of barbed-wire fence was put up, with one double gate. Some 150 feet of wharf was built, with a pierhead 25 feet long and 6 feet wide on the outside end, and with two landing platforms 6 by 8 feet, one on each end of the pierhead. Various repairs were made.

1127. Sabine Bank light and fog-signal station, Gulf of Mexico, Texas.—By the act approved June 6, 1900, an appropriation of \$40,000 was made for a light and fog-signal station at this point, and authority given to enter into contract for its construction at a total cost not exceeding \$80,000. By the act approved March 3, 1901, \$40,000 was appropriated to satisfy the contract. The plans and specifications were commenced.

—*Sabine Pass Jetty light and fog-signal station, Louisiana and Texas.*—The following recommendation, made in the Board's last two annual reports, is renewed:

The protecting mat of the east jetty extends out about 4 miles, and the nearest light to its entrance is a small beacon light about $1\frac{1}{4}$ miles inside the end, too far inside to serve as a guide to the entrance of the jetty. Sabine Pass as a port of entry has grown rapidly. The receipts and shipments for 1896 and 1897 show an increase from \$199,000 in 1896 to \$475,288 in 1897. It appears from the records that 99 vessels entered and cleared during 1897, that there were 403 trips made, and that 104,333 was the net registered tonnage. The largest vessel which passed out drew 23.6 feet. The Board therefore deems that the needs of this port require the establishment here of a light and fog-signal. It is estimated that a suitable structure here, similar to the one at Brazos Santiago, Texas, can be built for \$40,000. It is therefore recommended that an appropriation of this amount be made therefor.

The House of Representatives Committee on Appropriations called for suggestions from the Treasury Department as to the propriety of passing H. R. bill No. 1135, appropriating \$40,000 for the establishment of a light-house at Sabine Pass, and was informed by letter of February 9, 1899, that the Treasury Department recommended the passage of the bill in question.

1129. Sabine Pass on Brandt Point, east side of the entrance to Sabine Pass, Louisiana.—Contract was made for repairing the old wharf and building a new wharf and boathouse; work was begun in June. Some 380 feet of plank walk was rebuilt by hired labor. Various repairs were made.

1130. *Galveston Jetty, Texas.*—Plans and specifications for the erection of a light and fog-signal station near the end of the north jetty were being prepared, but before they could be completed the storm of September 7, 1900, occurred. A plan is now under consideration covering the character of the light and its location.

1135. *Bolivar Point, north side of the entrance to Galveston Bay, Texas.*—An effort was made to repair this station by contract, but the bids received being considered excessive were rejected, and the work is being done by hired labor. Some 1,786 running feet of picket fence was built and fitted with gates. Various minor repairs were made.

1140. *Trinity River Beacon, Texas.*—A beacon was built on the south jetty, at the mouth of Trinity River, Galveston Bay, Texas. It is 75 feet from the outer end, and consists of a lantern supported on a post braced by four rails. A platform was constructed at the base of the post; also a small lamp house.

1141. *Brazos River Jetty, entrance to Brazos River, Texas.*—This station was wrecked by the hurricane of September, 1900, and a temporary light on a post was substituted for it near the location of the former light. A new structure was built by contract, but neither light nor fog-signal has yet been put into operation. It is a one-story frame building, with three rooms on the first and one on the second floor, which will contain the striking machinery of the fog-signal and the lantern. It stands on the jetty on the western side of the entrance to Brazos River, Texas, about 1,500 feet from the north end, and will form a range with Brazos River light-station and the light on the south end of the west jetty. It rests on a pile foundation, and has a gallery and a cistern standing near the southeast corner, to which it is connected with gutters and lead pipe.

1142. *Brazos River, Texas.*—The keeper's dwelling was rebuilt. A shingle roof was put on the assistant keeper's dwelling. A picket fence, 750 feet long and 4 feet high, was built. Some 40 feet of plank walk was built. Some 560 feet of wharf was built. It is 6 feet wide, rests on iron-pipe piles, and has a pierhead at the outer end 40 feet by 20 feet and an incline at the inner end. The pierhead is protected by 11 fender piles, braced together and to the pierhead. The frame boat-house was rebuilt. Various repairs were made.

1143. *Matagorda, Matagorda Island, entrance to Matagorda Bay, Texas.*—The boathouse was rebuilt on wooden piles protected by copper. Repairs were made.

1145. *Corpus Christi Beacon, Texas.*—A lighted beacon was to be built by contract on the south end of the reef in front of the wharves at Corpus Christi, Tex. The one bid received was rejected as excessive, and the work will be done by hired labor. The material was ordered and is awaiting transportation to the site of the work.

— *Reimbursement of light-keepers for losses sustained during the hurricane of October 1, 1893.*—The following recommendation, which was made in the Board's last seven annual reports, is renewed:

Statements of these losses to the amount of \$2,603.62, approved and recommended by the inspector of the Eighth light-house district, were sent by the Secretary of the Treasury to the Speaker of the House of Representatives in his letters of March 7 and April 3, 1894, with recommendation that reimbursement be made. The Board recommends that an appropriation of this amount be made therefor.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

1045. Battery Gladden, Mobile Bay, Ala.	1087. Head of Passes, La.
1049. Horn Island Pass Beacon, Miss.	1112. Timbalier, La.
1066. Merrill Shell Bank, Miss.	1136. Fort Point, Tex.
1073. Port Pontchartrain, La.	1138. Red Fish Bar Cut, Tex.
1076. Chefuncte River, La.	1144. Aransas Pass, Tex.
1078. Amite River, La.	1447. Point Isabel, Tex.

LIGHT-VESSELS.

1081. South Pass light-vessel, No. 43, moored in 57 feet of water, of the South Pass entrance to the Mississippi River, Louisiana.—This composite light-vessel was built in 1880–81, is of about 187 tons gross burden, shows a fixed white light, and has a 12-inch steam whistle for a fog-signal. On August 17, 1900, this vessel was removed from her station for August, September, and the first half of October, and was replaced October 25, 1900. Some 30 tons of anthracite coal were furnished. There are numerous soft places inside and outside of the hull. Several rivets have rusted off inside, and considerable rust shows under the counters and about the bolts of the upper sheathing. The fender strakes are soft in places. The deck needs recalking in places. The windlass needs repairs. New boilers are needed.

1134. Galveston light-vessel, No. 28, inside of Galveston Bar, Gulf of Mexico, Texas.—This wooden light-vessel was built in 1888, is of about 101 tons burden, shows a fixed red light, and has a bell for a fog-signal. During the hurricane of September, 1900, she parted her moorings and was driven up Galveston Bay to about 1 mile south-west of the remains of Halfmoon Shoal light-house, where she was anchored. As she sustained severe injury, she was towed to New Orleans, arriving on October 11, 1900, to receive a new windlass and have necessary repairs made. A pump-brake windlass, with wooden center bit and iron side bits, a new starboard hawse pipe, and a new trysail mast were furnished. Her deck was calked; several graving pieces were let into the hull; repairs were made to the rail and whale boat, and the lantern house was retinned. On February 2, 1901, the vessel was replaced on her station.

— *Heald Bank light-vessel, Texas.*—There is a shoal spot directly in the fairway of vessels approaching Galveston from the Florida Straits. It is called Heald Bank, after Lieut. E. D. F. Heald, U. S. N. now dead, who in 1884 surveyed this locality. This bank is a danger to deep-draft ships under certain conditions of weather. In view of the large and growing commerce of the port of Galveston and the fact that Sabine Pass is rapidly increasing its importance as a port, and that a light-vessel near this shoal spot in connection with the light house to be erected on Sabine Bank would largely benefit vessels making either of these ports, it is considered that a suitable light-vessel with a fog-signal should be established near Heald Bank, which is a shoal spot in $4\frac{1}{2}$ fathoms of water lying about ESE. $\frac{1}{2}$ E. mag. from Bolivar Point light-house, in Galveston Harbor, distant about 34 miles. It is estimated that a steel steam light-vessel suitable for this outside station can be built for a sum not exceeding \$90,000, and the Board recommends that an appropriation of this amount be made therefor.

DAY OR UNLIGHTED BEACONS.

Sand Island day beacon, Alabama.—This beacon was moved twice during the year to save it from being carried away by the sea.

Battles Wharf beacon, Alabama.—A day beacon was built on the end of the sand spit, in 10 feet of water. It is a single pile, unpainted, incased in cast-iron pipe filled with cement mortar, and is surmounted by a topmast fitted with latticework basket and a cross arm with eyebolt.

Great Point Clear day beacon, Alabama.—A day mark was erected on the sand spit making out from Point Clear, eastern shore of Mobile Bay, Alabama. It stands in $9\frac{1}{2}$ feet of water and is 23 feet high above water. It is a single pile, protected by iron pipe, and surmounted by a topmast which is fitted with a latticework basket and a cross arm.

Cutoff Channel range day marks, Mobile Ship Channel, Alabama.—These day beacons, each a single unmarked pile, surmounted by a mast bearing a latticework basket $18\frac{1}{2}$ feet high, were established on the southerly prolongation of the axis of the Cutoff Channel, off Mobile Bay light-house, to form a day range to guide outward bound deep-draft vessels through the best water.

Horn Island Pass day beacon, Mississippi.—A single pine pile, surmounted by a topmast fitted with a latticework ball 6 feet 6 inches in diameter at the center and 9 feet high, was erected near the center column of the old Horn Island light. It is painted black, and is 78 feet high above mean high water. It has four braces at the bottom.

Chefuncte River beacons, Louisiana.—Two day marks, consisting of single piles protected by terra-cotta sleeves filled with mortar and surmounted by latticework baskets, were built in 6 feet of water on the port side of the entrance to Chefuncte River. They are 620 feet apart, and the rear one is 700 feet from the breakwater of the light-station. With the light-station, they form a range for running the channel at the entrance to the river. One of these beacons was knocked down by a barge, but was rebuilt in its former location.

Pass Christian east and west entrance day beacons, Mississippi.—These day beacons, each a brown, single pile, $11\frac{1}{2}$ feet high, surmounted by a latticework basket 6 feet in diameter, were erected in 6 feet of water, one on the northerly side of the entrance from the eastward into Pass Christian Channel, and the other on the southerly side of the entrance from the westward into the same channel.

FOG-SIGNALS OPERATED BY STEAM OR HOT AIR.

1081. South Pass light-vessel, No. 43, Louisiana.—This 12-inch steam whistle was in operation about 191 hours, and consumed some 22 tons of anthracite coal.

BUOYAGE.

The following-named buoys and appendages were received during the year: Twenty wooden spar buoys, 12 third-class nun buoys, 12 third-class can buoys, 12 first-class buoy shackles, 12 second-class buoy shackles, 24 third-class buoy shackles, 180 fathoms $1\frac{1}{2}$ -inch buoy chain,

1 steel disk for bell buoy, and 4 steel balls. Four gas buoys were maintained in the entrance to Galveston Bay during the year.

The following-named buoys were established: Three third-class nuns and 1 third-class can to mark the dredged cut along north shore of Horn Island, Mississippi; a third-class can, No. 3, at Sabine Pass, Louisiana and Texas, and a second-class nun to mark a lump at Galveston entrance, Texas. The 17 nun and can buoys at Sabine Pass, Louisiana and Texas, were replaced by third-class wooden spar buoys.

The following-named buoys were discontinued: Cable, Outer, First Channel, Second Channel, Third Channel, and Turn buoys at the dredged channel into Biloxi Harbor, Mississippi; Wreck buoy off the entrance to Ship Island anchorage, Mississippi; Middle Ground buoy. Pass a Loutre, Mississippi River, Louisiana; Outer Bar, Bar, Inner Bar, and inside channel buoys, Southwest Pass, Mississippi River, Louisiana, and Inner Bar and Turn buoys, Pass Cavallo, Texas.

LIGHT-HOUSE DEPOTS.

Mobile, Ala.—Under an appropriation of \$12,000 made by the act of March 3, 1899, for the erection of a depot at or near Mobile, Ala., continued effort was made to exchange the reservation at Choctaw Point, Alabama, for another site of equal value and equally as well or better adapted for the purpose, but without success.

Port Eads, La.—Some repairs are needed to the wharf, and plans and specifications are being prepared with a view of having the work done by contract.

LIGHT-HOUSE TENDERS.

Pansy.—This iron twin-screw steamer, which was built in 1878, is of 343 tons gross burden. She cared for the buoys, delivered fuel, provisions, and supplies to the light-houses, and conveyed the inspector on his quarterly visits of inspection to the lights. She delivered annual supplies to the light-stations in lakes Borgne and Pontchartrain. She rebuilt two post lights on the Mississippi River below New Orleans, repaired three, and moved two. She changed 158 buoys, placed 6, replaced 11, recovered 7, relieved the 4 gas-lighted buoys at Galveston entrance, and replaced and relighted them three times during the year. A new main deck and plank-sheer were placed. The vessel was docked, and the hull was painted below the water line. A number of frames and plates were eaten away by rust, in some instances the plates had decreased in thickness from three-eighths to one-eighth of an inch, and the frames were rusted to such a degree that some of them were eaten in two and were no support whatever. While the vessel was in dock, 23 new plates and 92 new frames were put in, 11 frames were reinforced, and the rudder pintals were repaired. The tender steamed about 8,729 miles and consumed some 595 tons of coal.

Tender for the Eighth light-house district.—By the act approved March 3, 1901, an appropriation of \$125,000 was made for constructing, equipping, and outfitting, complete for service, a new steam tender for buoyage, supply, and inspection in the Eighth light-house district. The preliminary calculations have been made, and the work of making plans and specifications is well in hand.

Tender for Mobile Ship Channel, Alabama.—The following recommendation made in the Board's last annual report is renewed:

For several years past the 20 lights in Mobile Ship Channel, Alabama, were attended by chartered steamers. These lights make the channel which the Government cut through Mobile Bay useful at night. They are placed on either side of the channel from one end to the other. The lights are supposed to burn for 60 hours, and would, but for occasional collisions by passing vessels, floating logs, etc., which jar them so that they go out. It is necessary, therefore, that each light be visited as nearly as possible every 24 hours, not only to clean the outside of the lanterns from incrustations of salt from evaporated salt water, which give the light a veiled aspect, but also to fill the receivers with oil to replace that which has been thrown out by collision, and, in general, to keep the lights in such condition as to give the best illumination. After several years' experimentation with chartered tugs, the Board deemed that it would be in the interests, not only of commerce and navigation, but of economy, to provide a small steel steamer of proper size, proper power, and proper appliances for this special work. There are in Mobile Bay and Harbor 6 iron nun and can buoys, a bell buoy, a whistling buoy, and 11 wooden day beacons, all of which could be cared for by this steamer, thereby relieving the overworked tender for the whole district from this work. The steamer could also be made of great use in connection with the establishment of the light-house depot in this harbor, for which an appropriation of \$12,000 has been made. It is estimated that a suitable steamer can be provided, under present conditions of labor and material, at a cost not exceeding \$40,000. The Board has the honor to ask that the proper measures may be taken to obtain an appropriation of that amount for this purpose.

Arbutus.—This wooden twin-screw steamer was built in 1879, and is of 400 tons gross burden. She was engaged during a part of the year in delivering materials and assisting in repairs to stations. She was the second Government vessel to reach Galveston with relief after the hurricane in September, 1900. She delivered water and supplies to Fort Point light-station, went with relief to Quintana and Velasco, and assisted the inspector in laying buoys. She visited and inspected the following-named stations: Sand Island light-station, Alabama; South Pass light-station, Louisiana; Calcasieu light-station, Louisiana; Fort Point light-station, Texas; Brazos River Jetty light-station, Texas, and Brazos River light-station, Texas. She delivered material for use in repairs to Pass a Loutre, Ship Shoal, Timbalier, and Calcasieu light-stations, Louisiana, and for Brazos River Jetty, Brazos River, Fort Point, Bolivar Point, and Red Fish Bar Cut light-stations, Texas. She took up the cable lines between Biloxi and Ship Island and between South Pass light-station and Port Eads, delivered materials and assisted in the erection of Horn Island Pass day beacon, in putting down fender clusters at lighted beacons, and in repairing day marks in Mobile Bay. She steamed some 13,852 miles and consumed about 660 tons of coal.

HIRED VESSELS.

Wanderer.—This wooden schooner was hired and employed during a part of the year. She delivered materials for use in the removal of Horn Island light-station to a new site, for repairs to Port Pontchartrain, Bayou St. John, and Timbalier light-stations, Louisiana, and delivered materials and made the changes in Choctaw Pass Channel rear beacon. She was also used in connection with repairs to lighted beacons and day marks in Mobile Bay.

Lizzie Haas.—This schooner, which was not hired until late in June, aided in scaling and painting five of the lighted beacons in Mobile Bay.

NINTH DISTRICT.

This district includes all aids to navigation on Lake Michigan, Green Bay, and tributary waters lying west of a line drawn across the Straits of Mackinac just east of Old Mackinac Point light-station, Michigan.

Inspector.—Commander F. M. Symonds, United States Navy.

Engineer.—Capt. James G. Warren, Corps of Engineers, United States Army.

There are in this district—

Light-houses and beacon lights.....	
Light-vessels in position	
Fog-signals operated by steam, caloric, or oil engines.....	
Fog-signals operated by clockwork	
Gas-lighted buoys in position	
Bell buoy in position	
Other buoys in position	
Steamer <i>Dahlia</i> , buoy tender, and for supply and inspection	
Steamer <i>Alice M. Gill</i> .	

NOTE.—The number preceding the name of a light-station in the Ninth, Tenth, and Eleventh districts, and that portion of the Third district on Whitehall Narrows, and the United States waters of Lakes Champlain and Memphremagog is that by which it is designated in the List of Lights and Fog-Signals of the United States on the Northern Lakes and Rivers, corrected to the opening of navigation, 1901.

All of the light-stations were inspected. All coast lights and fog-signals at stations to the southward of and including South Manitou Island light-station and on the westerly side of the lake to the southward of and including Sturgeon Bay Canal light-station were maintained throughout the winter. Harbor lights south of the stations named were exhibited when vessels could enter the harbors. The light and fog-signals at Old Mackinac Point, Michigan, were kept in operation until the ice in the straits was solid, and until the steam ferry running between Mackinaw City and St. Ignace had made a channel, when they were no longer necessary.

LIGHT-STATIONS.

413. *Old Mackinac Point, Straits of Mackinac, Michigan*.—The proceedings in the condemnation for additional land begun in the year 1899 have not yet been completed. The three commissioners appointed in the case duly filed their report, allowing to Mackinaw City \$400 compensation for the taking of the two lots and \$1,500 for damage to adjacent property. Objections were filed, and these objections were argued and submitted in December last. No decision has yet been rendered by the court. Various repairs were made.

426. *Petoskey beacon, Lake Michigan, Michigan*.—A fence was built across the breakwater pier. The beacon was damaged by a schooner *Willie Loutit*, on July 11, 1900. The cost of repairs was collected from the owners. Various repairs were made.

429. *Grand Traverse, Lake Michigan, Michigan*.—The keeper's dwelling was converted into quarters for two keepers. A well and permanent water supply was placed in front of the fog-signal building. Various repairs were made.

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8° 00'

430. *Mission Point, Lake Michigan, Michigan.*—A new metal lining was put in the dome of the lantern. Some 198 running feet of tight board fence, 344 feet of wire fence with a wooden top rail, and 350 feet of walk were built.

432. *South Manitou, Lake Michigan, Michigan.*—A large metal tank was placed in the fog-signal house to increase the water supply of the station. Various repairs were made.

433. *Point Betsey, Lake Michigan, Michigan.*—The walks around the structures, consisting of 403 running feet, were renewed. Various repairs were made.

434-435. *Frankfort Pierhead Range, Lake Michigan, Michigan.*—A prism of a lens lantern was shaken out during the gale of January 19, 1901. A 270-degree lens lantern was placed until this lens lantern was repaired. Some 100 feet of elevated walk, damaged by the storm of March 20, 1901, was renewed. A coal bin was built. A fog-signal was established here on May 1, 1901. It consists of a 2-horsepower oil engine, with a blower and blower siren and a copper trumpet. The apparatus is located in the lower portion of the pierhead beacon, and arranged to give blasts of $7\frac{1}{4}$ seconds duration, with $7\frac{1}{4}$ seconds silent interval. As the signal has no duplicate, the fog bell is retained in position. The lower part of the beacon was inclosed for the reception of the fog-signal apparatus, and 101 feet of the elevated walk was rebuilt. Some 156 running feet of walk on the pier in the rear of the oil house was renewed.

436-437. *Portage Lake Pierhead Range, Lake Michigan, Michigan.*—Plans were made for moving the pierhead tower to the end of the pierhead, erecting a rear tower or post for the lens-lantern light, and for building 700 feet of metal elevated walk. This work will be taken in hand when the piers are completed.

The following recommendation, made in the Board's last five annual reports, is renewed:

This station consists of two lights on the Government pier, but there is no dwelling here for the keeper. It is estimated that an appropriate structure can be erected for \$3,500, and it is recommended that an appropriation of this amount be made therefor.

438. *Manistee Pierhead, Lake Michigan, Michigan.*—Some 175 feet of new elevated walk was built. Various repairs were made.

439. *Manistee, Lake Michigan, Michigan.*—A brick oil house was built. Various repairs were made.

442-443. *Ludington Pierhead Range, Lake Michigan, Michigan.*—The dwelling for the keeper was completed. The boathouse and crane were removed to the south pier. A flag staff 41 feet long was provided. Various repairs were made.

447. *White River Pierhead, Lake Michigan, Michigan.*—The beacon was removed about 18 feet to a temporary position, that repairs might be made to the pier. Owing to the extension of the pier at White River by the War Department, the work of moving the beacon 100 feet outward and the erection of 214 feet of metal elevated walk will be done at an early date.

452. *Muskegon Lake Beacon, Lake Muskegon, Lake Michigan, Michigan.*—A five-day lens lantern was placed at this station September 18, 1900, in place of the old lantern. Some 80 feet of plank walk, supported on piles, was built to the shore.

453. *Bank Point Beacon, Lake Muskegon, Lake Michigan, Michigan.*—A beacon was built at the southerly end of the shoal near Bank Point in Muskegon Lake to take the place of the buoy at that point. The beacon consists of a cluster of six piles, surmounted by a small frame structure, the front of which is glazed to receive a lens lantern to illuminate 242 degrees of the horizon. The light will be shown on July 6, 1901.

455. *Grand Haven, Lake Michigan, Michigan.*—The plank platform on the west side of the keeper's dwelling was renewed and a tramway and stairs were built up the bluff leading to the station. Various repairs were made.

456-457. *Holland Pierhead Range, Lake Michigan, Michigan.*—A lantern carriage and wire rope were provided for running out the lantern light to the post on the pierhead. A washout of the ground in front of the keeper's dwelling was remedied by placing double planking on the inner side of the harbor piers, capping them with 6-inch timbers for 100 feet and filling them with 110 cubic yards of earth. A metal beacon was contracted for.

The following recommendation made in the Board's last annual report is renewed:

Holland is a port of entry for Grand Rapids and is doing a lake business, both passenger and freight, during the season of navigation. The Board is therefore of opinion that a fog-signal should be established at Holland in connection with the pierhead light. It is estimated that it can be established here for not exceeding \$6,000. The Board therefore recommends that an appropriation of this amount be made therefor.

460. *South Haven Pierhead, Lake Michigan, Michigan.*—The beacon was moved some 249 feet toward the outer end of the pier and new sills were provided. An elevated walk 249 feet in length was built. The illuminating apparatus was repaired and a cast-iron pedestal base was provided to adjust the lens to the proper height.

461-462. *St. Joseph Pierhead Range, Lake Michigan, Michigan.*—The smokestacks of the fog-signal were replaced by a combined smokestack. The removal of the light to the outer end of the pier is made necessary by the project of the War Department. The metal work for 1,000 feet of elevated walk was bought by contract, and was transported by the light-house tender to the St. Joseph light-house depot where it will be stored until the work on the piers is finished.

463. *St. Joseph, Lake Michigan, Michigan.*—It is proposed to change the characteristic from a fixed white light, varied by a white flash every 45 seconds to a flashing white every 30 seconds, and to change the apparatus to ball-bearing. The lens pedestal and material required to carry this into effect have been ordered and the work is being done.

464. *Michigan City, Lake Michigan, Indiana.*—A cast-iron subbase was put under the pedestal of the illuminating apparatus to adjust the height. The act approved June 6, 1900, appropriated \$5,500 for the establishment of a fog-signal at this place. The work has been suspended until the War Department shall have completed the extension to these piers.

465. *Calumet Pierhead, Lake Michigan, Illinois.*—Minor repairs were made.

The Board in its annual report for 1899 stated that—

The dwelling is in a deplorable condition, unfit for human habitation. It is estimated that a new dwelling can be built for \$7,500, and recommendation is made that an appropriation of that amount be made therefor.

The following recommendation made in the Board's annual report for 1900 is renewed:

The Board now recommends that authority be obtained from Congress to use the \$7,500 appropriated by the act approved on July 1, 1898, for establishing a light-station at or near the north Government pier at South Milwaukee, Lake Michigan, Wisconsin, to establish a keeper's dwelling at Calumet pierhead, as the necessity for establishing a light at South Milwaukee is not now apparent, and the need of a keeper's dwelling at Calumet pierhead is greater than ever before.

The dwelling is much worse than ever before. It is urgently recommended that an appropriation be made of the \$7,500 needed to make these quarters habitable.

468-469. *Chicago Pierhead Range, Lake Michigan, Illinois.*—The gas engine was removed and the light was changed to an oil light.

470. *Chicago Harbor, Lake Michigan, Illinois.*—Sound deflectors for the fog-signal whistles were placed in position. A 10-inch whistle replaced a defective one. Various repairs were made.

471. *Chicago outer Breakwater, northwest end, Lake Michigan, Illinois.*—The light was changed from fixed white to fixed red on December 8, 1900. A 5-day 360-degree lens lantern was substituted for the 1-day 360-degree lens lantern.

472. *Grossepoint, Lake Michigan, Michigan.*—The fog-signal apparatus was provided with sound deflectors for each house. Minor repairs were made.

473. *Waukegan Harbor, Lake Michigan, Illinois.*—A fence was erected across the pier. The old tower and lantern on the roof of the dwelling were removed, the light having been discontinued some two years. Various repairs were made.

474. *Kenosha, Southport, Lake Michigan, Wisconsin.*—On January 25, 1901, the characteristic of the light was changed from fixed white, varied by a white flash every 45 seconds, to flashing white every 15 seconds. In making this change the lens was altered to give two flash panels and two dark panels. Sand that had accumulated at the north line fence at the light-house site was removed and 94 running feet of tight board fence was rebuilt. Various repairs were made.

475. *Kenosha Breakwater Beacon, Lake Michigan, Michigan.*—On October 26, 1900, a fixed red lens-lantern light was established on the southeasterly end of Kenosha breakwater. The lens is hung from a temporary metal post erected on the breakwater, and a timber protection consisting of six courses of 12-inch by 12-inch timber, 18 feet long, V-shaped, was built on the exposed side of the breakwater.

476. *Kenosha Pierhead, Lake Michigan, Wisconsin.*—Owing to the widening of the entrance to Kenosha Harbor and the reconstruction of the north pier, the sixth-order light contained in the pierhead tower was moved to the outer end of the pier, about 380 feet eastward and 70 feet northward of its old position. An elevated metal walk was built for the entire length of the newly constructed pier, a distance of some 1,040 feet.

A blower siren, operated by air, was established on April 25, 1901. The plant is what is known as a blower siren, operated by a blower, by duplicate 2-horsepower oil engines. The plant is housed in the lower part of the beacon, which was remodeled and inclosed in order to give the necessary accommodation.

477. *Racine Reef Beacon, Lake Michigan, Wisconsin.*—The light was raised 20 feet by the addition of a pyramidal skeleton metal

frame erected on the former metal tower. Some 25 cords of rip rap stone were placed as a protection to the foundation. The light is a compressed gas light and has been very unsatisfactory, not only in its illuminating power, but on account of the difficulty of approaching it for recharging the tanks, the station being one that is to be kept lighted throughout the winter. The light has been out several times during the past winter, the extinguishing occurring when the tower was most difficult of access for recharging. The apparatus has never given satisfaction. The contractors have been authorized to make a change from the lens lantern furnished by the light-house engineer to a lantern of their own make.

478. *Racine Breakwater Beacon, Lake Michigan, Wisconsin.*—A fixed red lens-lantern light was established at the southerly end of the Racine breakwater on October 13, 1900. The lens is hung from a temporary metal post erected on the breakwater. A timber protection, consisting of six courses of 12 inch by 12 inch timber, V-shaped, 18 feet long each way, is built on the exposed side of the breakwater.

479. *Racine Pierhead, Lake Michigan, Wisconsin.*—It having been decided to discontinue the pierhead light and to establish a fourth-order red light at the pierhead with the discontinuance of that light on the keeper's dwelling, plans were prepared for a metal pierhead beacon, and a contract was made for the construction of the metal work of this beacon. The wooden tower was moved out some 24 feet to give space for placing the foundation of the new metal tower on that site, to which a temporary elevated walk was extended. The deck of the pier at the site was removed and molds formed in the pockets for the concrete foundation. Four concrete piers for the foundation of the metal beacon, with the anchors, were built in the end of the pier and the foundations were covered with boards until the erection of the metal tower.

480. *Racine, Lake Michigan, Wisconsin.*—Additions and alterations were made to the dwelling, arranging the rooms of the first story and basement for the occupancy of the keeper, and those of the second story for the assistant. A temporary shed was built on a corner of the light-house pier for the protection of material. As soon as the new metal structure is erected, this light will be discontinued and the lantern will be removed.

481. *Wind Point, Lake Michigan, Wisconsin.*—A brick fog-signal house was erected for the reception of the compressed-air fog-signal, which was put into operation December 8, 1900, at which time the characteristic was changed to blasts of 3 seconds duration and silent intervals of 27 seconds. Permission was granted, by a revocable license, for the construction of a branch of the Chicago and Northwestern Railway across the Government right of way to the station from the main road. Various repairs were made.

483. *Milwaukee Breakwater, Lake Michigan, Wisconsin.*—The timber protection which was damaged by the storm of March 8 and 9 was thoroughly repaired and bolted in place, and extra braces and foundation timbers were provided.

The following recommendation, made in the Board's annual reports for 1899 and 1900, is renewed:

By act of Congress approved March 3, 1899, funds were provided for the completion of this breakwater, and there is reason to believe that the work will be completed in November, 1900; meantime the Board has provided that a temporary beacon light be established upon the south end of the breakwater with two five-day lens lanterns showing a red above a white light. A permanent light for the lighting of the break-

water should be provided and should be ready as nearly as possible when the breakwater is completed. The Board is of the opinion that the interests of commerce and navigation require that a fourth-order light should be shown from an iron tower supported by crib and masonry foundations or by a metal caisson filled with concrete, and that a fog-signal should be operated from this point. It is estimated that such structures would cost \$75,000, and it is recommended that an appropriation of that amount be made therefor.

487. *Sheboygan Breakwater Beacon, Lake Michigan, Wisconsin.*—On October 24, 1900, a fixed red lens lantern was established at the southeasterly end of the breakwater. The lens was hung from a wooden post erected on the breakwater, and a timber protection consisting of six courses of 12-inch by 12-inch timber, 18 feet long, V-shaped, was constructed on the exposed side of the breakwater.

488. *Sheboygan Pierhead, Lake Michigan, Wisconsin.*—A contract was made for furnishing metal work for an elevated walk. The contractors completed their work, and the light-house tender transported the metal work from Milwaukee to the St. Joseph light-house depot, where it was stored until required. Some 40 feet of elevated walk was renewed. A new smokestack for the fog-signal was erected. Various repairs were made.

490. *Manitowoc Breakwater, Lake Michigan, Wisconsin.*—A smokestack was erected. A whistle was delivered and the old one taken away for repair. Various repairs were made.

493. *Twin River Point, Lake Michigan, Wisconsin.*—Material for providing a landing for the fog-signal supplies was obtained, and a portable dock was built at the warehouse and painted. Various repairs were made.

494-495. *Keweenaw Pierhead Range, Lake Michigan, Wisconsin.*—The following recommendation, which has appeared in the last five annual reports of the Board is renewed:

This station, which consists at present of range lights and a steam fog-signal, has no dwelling for the keepers. It is estimated that proper structures can be erected for \$7,500, and it is recommended that an appropriation of this amount be made therefor.

Minor repairs were made.

499. *Sturgeon Bay Canal, Lake Michigan, Wisconsin.*—On August 18, 1900, the color of the tower as a day mark was changed from brown to white. The entire illuminating and revolving apparatus was dismounted, and all the revolving apparatus below the lens ring, except the table, was removed and replaced. Various minor repairs were made.

506. *Cana Island, Lake Michigan, Wisconsin.*—The boathouse was repaired, moved some 40 feet farther out toward the water, and placed on a crib foundation.

507. *Porte Des Morts, Lake Michigan, Wisconsin.*—The dwelling was enlarged and altered to provide separate quarters for the keeper and first assistant keeper. Each of these quarters now contains an entrance, a staircase, five rooms, and a cellar. The unused fog-signal house was arranged for a dwelling for the second assistant keeper. The material has been purchased and delivered for lining the fog-signal building with metal, resurfacing the floor with concrete, extending the tramway, and repairing the west landing.

510. *Fisherman Shoal, Lake Michigan, Wisconsin.*—The following recommendation was made by the Board in its annual reports for 1895, 1896, 1897, 1898, and 1899:

This shoal rock, which is near Rock Island, forms a dangerous obstruction to the increasing number of vessels passing in this vicinity. It is proposed to establish a

light and fog-signal on this shoal in the interest of this commerce. It is estimated that it can be done for \$50,000, and it is recommended that an appropriation of this amount be made therefor.

The following recommendation was made in the Board's annual report for 1900, and is renewed:

Because of the great rise in building materials and the cost of working at so exposed a locality, it is recommended that the amount be increased to \$75,000.

511. *Pottawatomie, Lake Michigan, Wisconsin.*—Materials were delivered for repairs to the dwelling, and much of the work was done.

512. *St. Martin Island, Lake Michigan, Michigan.*—Plans and specifications for a metal tower were prepared, proposals for furnishing the metal work on the tower were invited, and three bids were received, which were rejected. It will now be necessary to await a further appropriation.

The following recommendation, which appeared in the Board's last annual report, is renewed:

It is now estimated that \$29,000 will be required to complete this station. Recommendation is therefore made that an additional appropriation of \$14,000 be made for this purpose.

— *Little Gull Island, St. Martins Passage, entrance to Green Bay, Lake Michigan, Michigan.*—The following statement and recommendation, made in the Board's last and in many previous annual reports, are renewed:

The establishment of a light and fog-signal here, at a cost not to exceed \$20,000, was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made.

The Board recommends that the amount authorized be appropriated.

— *Pointe aux Barques (Manistique), Lake Michigan, Michigan.*—The following appeared in the Board's annual reports for the last three years, and the recommendation is renewed:

The establishment of the Lake Michigan light and fog-signal vessels, Squaw Island light and fog-signal, Seul Choix Pointe light, and the additional buoyage authorized in the northern part of Lake Michigan has made those waters reasonably safe for navigation on the route from the Straits of Mackinac to Green Bay ports, with the exception of a stretch of 45 miles between Seul Choix Pointe and Poverty Island. Pointe aux Barques is a prominent headland $2\frac{1}{2}$ miles northeast one-half north from Poverty Island light, and 23 miles west-southwest from Seul Choix Pointe light. Poverty Island light is visible $16\frac{1}{2}$ miles, and Seul Choix Point is visible 15 miles. There is therefore a space of $13\frac{1}{2}$ miles off Pointe aux Barques not covered by any light. The town of Manistique, situated at the mouth of Manistique River, at the head of the bay between Seul Choix and Pointe aux Barques, has a large lumber trade, and many vessels call at that port. The route north of the Beavers and along the coast down to Poverty Island Passage into Green Bay is the usual route of the ore vessels to and from Lake Erie ports in northwest winds, and the shipments of ore this year from Escanaba are largely in excess, it is said, of those of any port in the world. The Board recommends that a coast light and fog-signal be established on Pointe aux Barques, Lake Michigan, Michigan. It is estimated that this can be done for a sum not to exceed \$32,000, and it is recommended that an appropriation of this amount be made therefor.

515. *Seul Choix Pointe, Lake Michigan, Michigan.*—Improved third-order burners were provided. A metal floor was placed in the upper portion of the tower to form a watch room. Material for an additional oil house was provided. The fog-signal apparatus was overhauled. A new combined smokestack for the two boilers was provided.

516. *Squaw Island, Lake Michigan, Michigan.*—The engines and boilers were overhauled. The boatways were extended 30 feet, and

104 feet of strap-iron track was laid on the boatway and into the boat-house. A boat car was built. Some 159 feet of plank walk was relaid. Various repairs were made.

520. *Point Peninsula, Green Bay, Michigan.*—Metal hand rails were placed on the tower stairs and new lining put in the lantern. Ball bearings for the revolving apparatus were provided, as were materials for enlarging a brick outbuilding and converting it into an oil house.

522. *Escanaba, Green Bay, Michigan.*—Metal hand rails were placed on the tower stairs. A brick oil house was built. Materials were provided for repairing and renewing the sidewalks, and for renewing the sink and sewer.

523. *Squaw Point, Green Bay, Michigan.*—Metal hand railings were placed on the tower stairs. A brick oil house was built. A plank walk was laid from the dwelling to the boathouse. Various repairs were made.

530. *Menominee Pierhead, Green Bay, Michigan.*—A concrete foundation 15 feet square and extending from the water level on the stone filling of the crib to the top of the crib was built under the metal tower. A coal shed between the fog-signal house and tower was rebuilt. A new combined smokestack was provided. The fog-signal apparatus was overhauled. Various repairs were made.

535. *Tail Point, Green Bay, Wisconsin.*—Some 20 cords of riprap stone were placed around the pier. Various repairs were made.

537, 538. *Grassy Island (lower and upper) Green Bay, Wisconsin.*—Both towers at this station were thoroughly repaired. Some 40 cords of stone were placed as a guard against damage from high water. A brick oil house was built. Various repairs were made.

539. *Elbow Beacon, Green Bay, Wisconsin.*—Some 10 cords of stone were placed around the piles as protection from ice.

542. *Menasha River (lower) Beacon, Little Butte des Morts Lake, Wisconsin.*—The mast and light were removed at the close of navigation, 1900, and reerected at the opening of navigation this season.

543. *Menasha River (upper) Beacon, Lake Winnebago, Wisconsin.*—The mast and light were removed at the close of navigation, 1900, and reerected at the opening of navigation this season.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

- | | |
|------------------------------------------------|-----------------------------------|
| 414. McGulpin Point, Mich. | 458. Kalamazoo pierhead, Mich. |
| 415. St. Helena, Mich. | 459. Kalamazoo, Mich. |
| 421. Waugoshance, Mich. | 482. Milwaukee pierhead, Wis. |
| 422. Skilligallee, Mich. | 484. Milwaukee, Wis. |
| 423. Beaver Island Harbor, Mich. | 486. Port Washington, Wis. |
| 424. Beaver Island, Mich. | 489. Sheboygan, Wis. |
| 425. Little Traverse, Mich. | 491. Manitowoc pierhead, Wis. |
| 427. Charlevoix pierhead, Mich. | 508, 509. Plum Island range, Wis. |
| 428. South Fox Island, Mich. | 513. Poverty Island, Mich. |
| 431. North Manitou, Mich. | 524. Cedar River, Mich. |
| 440. Big Sable (Grande Pointe au Sable), Mich. | 528. Eagle Bluff, Wis. |
| 446. Petite Pointe au Sable, Mich. | 529. Chambers Island, Wis. |
| 448. White River, Mich. | 531. Green Island, Wis. |
| 449, 450. Muskegon pierhead range, Mich. | 532. Sherwood Point, Wis. |
| 454. Grand Haven pierhead, Mich. | 533, 534. Dunlap Reef range, Wis. |

LIGHT-VESSELS.

417. *White Shoal light-vessel, No. 56, Lake Michigan.*—This wooden steam screw light-vessel was built in 1891, is of about 130 tons gross burden, and has a 6-inch steam fog-signal. On December 10 1900, she went into winter quarters at Cheboygan, Mich. While there she was supplied with fuel and mineral oil and received the following-named repairs: About 500 running feet of planking was removed from the hull and was replaced by new, about 600 running feet of deck planking was removed and replaced by new, a slight leak in the bow was repaired, and the stern bearings and the rudder were examined by a diver and were repaired. All loose braces of the boiler were set up, one new main feed pipe was furnished and fitted, all feed pipes and attachments were examined and defective ones were replaced by new, and a new eccentric strap for the deck engine was furnished and fitted. While making the repairs to the hull it was found, on removing the outside rotten planking, that the frames were more or less rotten above the water line. Her boilers were inspected March 26, 1901, and found to be in good condition. She returned to her station on April 20, 1901.

419. *Grays Reef light-vessel, No. 57, Lake Michigan.*—This wooden steam screw light-vessel was built in 1891, is of about 130 tons gross burden, and has a 6-inch steam fog-signal. She left her station on December 10, 1900, and went into winter quarters at Cheboygan, Mich. While there she received fuel and mineral oil and the following-named repairs: About 500 running feet of outside rotten planking was removed and replaced by new, about 600 running feet of deck planking was removed and replaced by new, and all the piping of the boilers was overhauled and such as was defective was replaced by new. While making the repairs to the hull it was found, on removing the outside rotten planking, that the frames were more or less rotten above the water line. Her boilers were inspected on March 26, 1901, and found to be in good condition. She returned to her station on April 20, 1901. On April 26, 1901, this light-vessel was moved about 3,150 feet southeast by east from her former position and moored in 24 feet of water.

517. *Lansing Shoal light-vessel, No. 55, Lake Michigan.*—This wooden steam screw light-vessel was built in 1891, is of about 130 tons gross burden, and has a 6-inch steam fog-signal. She left her former station, Simmons Reef, on December 10, 1900, and went into winter quarters at Cheboygan, Mich. While there she was supplied with fuel and mineral oil and received the following-named repairs: The main deck and covering board were calked, puttied, and payed with white lead. About 450 running feet of deck plank was removed. A new sheer ribbon was placed around the vessel. About 500 running feet of outside rotten planking was removed and replaced by new. All feed pipes and attachments to the boiler were examined and defective ones replaced by new. All tubes were replaced by new ones and loose braces were refitted. While making the repairs to the hull it was found, on removing the outside planking, that the frames above the water line were rotten and in bad condition. Her boilers were inspected on March 26, 1901, and found to be in good condition. She returned to her station on April 20, 1901. On July 10, 1901, she was transferred to her present station.

521. *Eleven Foot Shoal light-vessel, No. 60, Lake Michigan.*—This wooden light-vessel was built in 1893, is of about 100 tons net burden, and has a 6-inch steam fog-signal. She left her station on December 5, 1900, and went into winter quarters at Escanaba, Mich. While there she received fuel and mineral oil and the following-named repairs: About 50 running feet of rotten deck planking was removed and replaced by new, and the steam drum was recovered with asbestos. Her boiler was inspected on January 4, 1901, and found to be in good condition. She returned to her station on April 23, 1901.

— *Peshtigo, Green Bay, Lake Michigan, Wisconsin.*—The following recommendation, made in the Board's last three annual reports, is renewed:

This shoal lies on the north of Peshtigo River and projects for a long distance into Green Bay. The large and important commerce of the vicinity has for many years been seriously incommoded by the lack of a reliable mark at the end of the point. It is believed that a light of some kind on the end of Peshtigo Reef, about 4 miles from the shore, would be a valuable aid to navigation. As the water deepens rapidly near the 12-foot curve, it is difficult, if not impossible, to place a gas buoy there, and the liability of such a buoy to be carried away makes the placing of one there impracticable. The establishment of a light-house on the reef itself would be a dangerous experiment, owing to the tremendous push of floating ice in that vicinity. It seems, therefore, that the only practicable way of marking this reef is to establish a light-vessel in the immediate vicinity. This can be done at a cost not exceeding \$15,000, and it is recommended that an appropriation of this amount be made therefor.

By the act approved February 15, 1893, the establishment of a light-house, with a fog-signal, at or near Peshtigo Shoal, Green Bay, was authorized, at a cost not exceeding \$10,000, but as no appropriation has been made for the purpose, and as so much time has elapsed since the time of authorization, the question comes up almost as new matter.

FOG-SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

413. *Old Mackinac Point, Michigan.*—The 10-inch steam whistles in duplicate were operated some 419 hours and consumed about 58 cords of wood.

417. *White Shoal light-vessel, No. 56, Michigan.*—The 6-inch steam whistle was in operation some 175 hours and consumed about 10 tons of coal and 2 cords of wood.

419. *Grays Reef light-vessel, No. 57, Michigan.*—The 6-inch steam whistle was in operation some 202 hours and consumed about 9 tons of coal and 5 cords of wood.

421. *Waugoshance, Michigan.*—The 10-inch steam whistles in duplicate were in operation some 143 hours and consumed about 1 ton of coal and 32 cords of wood.

422. *Skulligallee, Michigan.*—The 10-inch steam whistles in duplicate were in operation some 161 hours and consumed about 3 tons of coal and 20 cords of wood.

424. *Beaver Island, Michigan.*—The first-class steam sirens in duplicate were in operation some 112 hours and consumed about 18 cords of wood.

428. *South Fox Island, Michigan.*—The 10-inch steam whistles in duplicate were in operation some 319 hours and consumed about 12 tons of coal and 43 cords of wood.

429. *Grand Traverse, Michigan.*—The 10-inch steam whistles in duplicate were in operation some 309 hours and consumed about 26 cords of wood.

431. *North Manitou, Michigan.*—The 10-inch steam whistles in duplicate were in operation some 374 hours and consumed about 35 cords of wood.

432. *South Manitou, Michigan.*—The 10-inch steam whistles in duplicate were in operation some 673 hours and consumed about 62 cords of wood.

433. *Point Betsey, Michigan.*—The 10-inch steam whistles in duplicate were in operation some 456 hours and consumed about 54 cords of wood.

434. *Frankfort Pierhead (front), Michigan.*—The blower steam siren was in operation some 51 hours and consumed about 14 gallons of oil. This signal was established on May 11, 1901, to take the place of the fog bell, which latter will be retained and used only in case the siren is disabled.

438. *Manistee Pierhead, Michigan.*—The 10-inch steam whistles in duplicate were in operation some 426 hours and consumed about 34 tons of coal and 2 cords of wood.

443. *Ludington Pierhead (rear), Michigan.*—The 10-inch steam whistles in duplicate were in operation some 442 hours and consumed about 40 tons of coal and 6 cords of wood.

449. *Muskegon Pierhead (front), Michigan.*—The 10-inch steam whistles in duplicate were in operation some 341 hours and consumed about 45 tons of coal and 4 cords of wood.

454. *Grand Haven Pierhead, Michigan.*—The first-class steam sirens, in duplicate, were in operation some 188 hours, and consumed about 22 tons of coal and 2 cords of wood.

461. *St. Joseph Pierhead (front), Michigan.*—The 10-inch steam whistles, in duplicate, were in operation some 246 hours, and consumed about 17 tons of coal and 4 cords of wood.

465. *Calumet Pierhead, Illinois.*—The 10-inch steam whistles, in duplicate, were in operation some 267 hours, and consumed about 41 tons of coal and 3 cords of wood.

470. *Chicago Harbor, Illinois.*—The 10-inch steam whistles, in duplicate, were in operation some 732 hours, and consumed about 78 tons of coal and 9 cords of wood.

472. *Grossepoint, Illinois.*—The 10-inch steam whistles, in duplicate, were in operation some 277 hours, and consumed about 27 tons of coal and 2 cords of wood.

476. *Kenosha Pierhead, Wisconsin.*—The compressed air blower sirens, in duplicate, were in operation some 77 hours, and consumed about 39 gallons of oil. This signal was established on April 25, 1901.

481. *Wind Point (Racine Point), Wisconsin.*—The compressed air sirens, in duplicate, were in operation some 275 hours, and consumed about 567 gallons of oil. This signal was established on December 8, 1900. The 10-inch steam whistles, in duplicate, which the sirens supplanted, were in operation some 237 hours, and consumed about 15 tons of coal and 1 cord of wood.

482. *Milwaukee Pierhead, Wisconsin.*—The 10-inch steam whistles, in duplicate, were in operation some 856 hours, and consumed about 51 tons of coal and 1 cord of wood.

483. *Sheboygan Pierhead, Wisconsin.*—The 10-inch steam whistles, in duplicate, were in operation some 478 hours, and consumed about 44 tons of coal and 1 cord of wood.

490. *Manitowoc Breakwater, Wisconsin*.—The 10-inch steam whistles, in duplicate, were in operation some 729 hours, and consumed about 62 tons of coal and 6 cords of wood.

493. *Twin River Point, Wisconsin*.—The 10-inch steam whistles, in duplicate, were in operation some 517 hours, and consumed about 59 tons of coal and 5 cords of wood.

495. *Kewaunee Pierhead (rear), Wisconsin*.—The 10-inch steam whistles, in duplicate, were in operation some 632 hours, and consumed about 46 tons of coal and 2 cords of wood.

498. *Sturgeon Bay Canal Pierhead, Wisconsin*.—The 10-inch steam whistles, in duplicate, were in operation some 518 hours, and consumed about 54 tons of coal and 4 cords of wood.

507. *Porte des Morts (Pilot Island), Wisconsin*.—The 10-inch steam whistles, in duplicate, were in operation some 250 hours, and consumed about 1 ton of coal and 52 cords of wood.

509. *Plum Island (rear), Wisconsin*.—The first-class steam sirens, in duplicate, were in operation some 263 hours, and consumed about 45 cords of wood.

513. *Poverty Island, Michigan*.—The 10-inch steam whistles, in duplicate, were in operation some 243 hours, and consumed about 2 tons of coal and 31 cords of wood.

515. *Seul Choix Pointe, Michigan*.—The 10-inch steam whistles, in duplicate, were in operation some 130 hours, and consumed about 15 tons of coal.

516. *Squaw Island, Michigan*.—The 10-inch steam whistles, in duplicate, were in operation some 184 hours, and consumed about 13 tons of coal and 5 cords of wood.

517. *Lansing Shoal light-vessel, No. 55, Michigan*.—The 6-inch steam whistle was in operation some 244 hours, and consumed about 21 tons of coal and 2 cords of wood.

521. *Eleven Foot Shoal light-vessel, No. 60, Michigan*.—The 6-inch steam whistle was in operation some 248 hours, and consumed about 11 tons of coal and 1 cord of wood.

530. *Menominee Pierhead, Michigan*.—The 10-inch steam whistles, in duplicate, were in operation some 215 hours, and consumed about 21 tons of coal and 4 cords of wood.

BUOYAGE.

The buoyage of this district is in excellent condition and is attended by the light-house tender *Dahlia*, with the exceptions of the buoy at St. Joseph Harbor entrance, Michigan, which is cared for by the keeper of the light-house supply depot, and the buoys in Green Bay south of Long Tail Point and channel buoys in Fox River, which are attended by contract.

LIGHT-HOUSE DEPOTS.

Charlevoix, north end of Lake Michigan, Michigan.—This depot is practically finished. The warehouse was completed in September. It consists of a 1-story brick building 40 feet wide by 90 feet long with seven steel trusses. The depot grounds were inclosed with a fence. One hand car and four buoy carriages, with steel frames and rollers to roll directly upon the hand car, were provided, the buoy carriages

being so constructed as to receive the large compressed gas buoys as in a cradle. A tramway 560 feet long was laid. The small dwelling already on the site when this ground was purchased was repaired for the custodian.

St. Joseph, Mich.—Repairs were made to the eave troughs of the custodian's dwelling, steps of landing and sidewalks, and the pier was decked. The drain pipe leading from the custodian's dwelling to the river was repaired. The water pipe from the city water main to the depot, leading under the river, which was broken under water, was repaired. All supplies received from the general light-house depot and those purchased for the district, and all blanks and stationery, were packed and issued to the tender *Dahlia*, for distribution to the light-stations. This depot is well kept. The channel abreast the wharf is gradually filling up and it is with difficulty the tender can enter and leave the depot.

— *Engineer storehouse, Milwaukee, Wis.*—This temporary storehouse, 16 feet wide by 100 feet long, is situated on the inner end of the north pier at Milwaukee and has been divided into three portions. The east end is arranged for a machine shop with a small compartment for the storage of illuminating apparatus; the center contains a room for the storage of tools and implements, with a loft over the same for the storage of such articles as rope, wheelbarrows, etc., and another portion is used for the reception of articles for general repair. The capacity of the storehouse for general repair is insufficient for the work of the district, it being necessary at times to store articles outside.

— *District machine shop, Milwaukee, Wis.*—This shop, situated in the easterly end of the temporary storehouse, is fitted with machinery and tools and has been of much service. The superintendent in charge of the illuminating apparatus has been almost continuously employed here in the preparation of various work for many light-stations, such as work on change of pedestals for the introduction of ball bearings, the repair of burners and lamps returned from stations, the renewal of damaged lens lanterns, the making of ball bearings, repair of revolving clocks, as well as repairs occasionally necessary for parts of the machinery and apparatus of fog-signal stations.

— *Depot for the Ninth light-house district, Milwaukee.*—The following recommendation, made in the Board's last two annual reports, is renewed:

This district is the only lake district which is kept in operation during the winter. This change has been made necessary as steamers, contrary to the former custom, ran during winter months throughout more than half of the area of the district. The Board has no place where the recently chartered tender can lie and take on material for construction and repair of light-houses. This hampers and interferes with the work of the district. The light-house depots at Charlevoix and St. Joseph are not available, as they are far from the office of the engineer of the Ninth light-house district and from the best markets for material. A suitable site for a light-house depot can be purchased at or near Milwaukee. This depot would afford wharves for the light-house tenders of both the light-house inspector and engineer, where they could tie up during the winter when not in use. The inspector with difficulty finds temporary accommodations at Chicago wharves for his tender. There is no place more accessible than Milwaukee where it can make its headquarters. It is estimated that a light-house depot could be established at Milwaukee for not exceeding \$50,000, and the Board recommends that an appropriation of this amount be made therefor.

The constant increase of construction and repair work in this district, the inadequacy of storage space in the temporary storehouse, the

smallness of the quarters in the district machine shop, and the anticipation of having a new steamer by the close of another year, demand that steps be taken at an early date to obtain an appropriation for this much-needed depot.

LIGHT-HOUSE TENDERS.

Dahlia.—This iron screw steamer was built in 1874, and is of about 427 tons gross burden. She has taken in and placed buoys, made trips of inspection, and delivered supplies. She has steamed some 11,763 miles on a consumption of about 666 tons of coal. During the year new bolts were fitted in the cylinder of the engine and boiler; the steam-chest joints on the main cylinder were planed off; the main valve and seat were refitted; 21 steam-chest bolts were removed and replaced with new; a new steam chest was furnished and fitted to the cylinder; a new cut-off valve was furnished; both ends of the carriers to the cut-off and main valves and links were bushed and fitted; the piston, follower, and packing rings were faced off and refitted, and 30 grate bars and 3 bridge walls were furnished. The anchor engine was repaired. She was docked and her bottom cleaned and painted with one coat of red lead, and some minor repairs were made to the hull. Her under-water section is in good condition.

Sumac.—The act approved on March 3, 1899, appropriated \$85,000 for constructing, equipping, and outfitting complete for service a new steam tender for buoyage, supply, and inspection in the Ninth light-house district. That amount being insufficient, the Board, in its last annual report and estimates, asked for \$30,000 more. The act approved on March 3, 1901, authorized a contract for the vessel at a cost not to exceed \$115,000, without making any further appropriation. The Board therefore renews its recommendation that \$30,000 more be appropriated for this vessel.

The contract having been authorized, plans and specifications were made, bids were invited, and a contract was made with the lowest bidder.

This tender, which is to be called the *Sumac*, is to be a twin-screw steel steamer of the following-named dimensions: Length over all, 168 feet 10 inches; length between perpendiculars, 160 feet; beam molded, 30 feet; depth of hold from top of main keel beam to top of keel amidships, 14 feet 1 inch; displacement, 700 tons. The vessel is to be built entirely of open-hearth mild steel, and is to have 5 main watertight bulkheads and 2 trimming tanks, located one fore and one aft. Bilge keels are to be fitted to about half the length of the ship. Ample space for handling buoys, etc., and for the storage of supplies, is provided; also quarters for the light-house inspector, members of the Light-House Board, officers, clerks, crew of the ship, and working force. Care has been taken to make all those accommodations roomy and well ventilated. The vessel being built over for about two-thirds of the length, has large storage space below and above the main deck. She is to be fitted with steam windlass, steam steering engine, steam heating, powerful pumps, and all modern improvements. She will have a mast, a gaff, and a heavy derrick boom for handling cargo and buoys. The derrick is to be operated by a powerful double-cylinder steam hoisting engine. The machinery will consist of two vertical, inverted, direct-acting, open-front, jet-condensing, fore and aft com-

1-12
pound engines, with cylinders 18 inches and 34 inches in diameter, and a stroke of 28 inches, driving right and left handed four-blade, cast iron propellers. Steam will be furnished by two boilers of the Scotch type, designed for a working pressure of 120 pounds per square inch, with a mean diameter of 12 feet 3 inches, and 12 feet in length.

The contract provides that the tender shall be ready on or before June 4, 1902.

Alice M. Gill.—The steamer *Alice M. Gill*, of about 264 tons gross burden, under charter as a light-house tender, was continuously employed from July 1 to November 28, 1900. She delivered materials in July at 15 light-stations. She received materials at 10 light-stations for return to the storehouse. The hull, boilers, and machinery of the tender were examined on July 22, 1900. During August the tender delivered materials at 24 light-stations, besides conveying the engineer of the district on a trip of inspection to nearly all the stations in the district. During September and October she delivered and placed riprap stone at 4 light-stations, and delivered material at 7 light-stations; conveyed a working party and surplus material from Pottawatomie to Grassy Island, and delivered material at 3 other stations. She delivered riprap stone, working party, and tools at Racine Reef beacon, Wisconsin, and material for making alterations and additions at 5 other stations. The metal elevated walk for Sheboygan pierhead, Portage Lake pierhead range, and St. Joseph pierhead range, with other material, she transported from Milwaukee to the St. Joseph light-house depot for storage for the winter, together with the cabin outfit. The steam-capstan windlass was taken aboard there, and the boat proceeded to Sheboygan, Wis., and was put out of commission on November 28, 1900. She went into commission again on April 10, 1901. She delivered tools, etc., at Racine pierhead, and visited St. Joseph, Mich.; took on board factory work, pontoons, small boats, and cabin outfit, and delivered material at 21 different light-stations. Material was taken on board at 7 stations for delivery. In June she delivered material at 10 light-stations. The tender took on board a working party at Wind Point, and tools at Racine for transportation to Muskegon Lake, to establish Bank Point beacon, and after assisting at this work proceeded to Petite Pointe au Sable with a working party, tools, and material, and 125 cubic yards of gravel. She steamed about 7,357 miles, and consumed some 462 tons of bituminous coal and about 234 tons of anthracite coal.

Hyacinth.—The act approved on June 6, 1900, appropriated \$50,000 toward the construction of a steam tender for construction and repair service in the Ninth light-house district, and authorized a contract therefor at a cost not to exceed \$100,000. Failure to secure bids on a similar vessel caused the Board to ask an increase of this appropriation to \$115,000; this was authorized, but was not appropriated by the act approved on March 3, 1901. Plans and specifications were prepared. Proposals for the construction of the steamer were invited by advertisement, the bids to be opened July 10, 1901. There is now needed the sum of \$65,000 to satisfy the authorized limit of cost, and the Board recommends that an appropriation of this amount be made therefor.

TENTH DISTRICT.

This district extends from the mouth of St. Regis River, St. Lawrence River, New York, to the mouth of the River Rouge, Detroit, Michigan. It embraces all aids to navigation on the United States shores and waters of Lakes Erie and Ontario and the upper part of St. Lawrence, the Niagara, and the lower part of the Detroit Rivers.

Spectator.—Commander Franklin Hanford, United States Navy, from October 22, 1900; Commander A. Dunlap, United States Navy, from October 22, 1900.

Engineer.—Maj. T. W. Symons, Corps of Engineers, United States Army.

In this district there are—

Light-houses and beacon lights.....	79
Light-vessels in position	3
Light-vessel for relief.....	1
Signals operated by steam.....	9
Signals operated by clockwork	6
Lighted buoys in position.....	23
Unlighted buoys in position.....	162
Steamer <i>Haze</i> , buoy tender, and for supply and inspection.....	1
Light barge <i>Warrington</i> , for construction and repair.....	1

All lights in this district, except those at Presqu'île, Pennsylvania, range lights at Conneaut and Ashtabula, Ohio, were extinguished at close of navigation, at various dates between December 10, 1900, and January 14, 1901. They were relighted between March 21 and April 20, 1901. The Presqu'île and Conneaut lights were maintained at intervals during part of the winter, as needed, and the Ashtabula lights and fog-signal were maintained at intervals for the benefit of fishermen and others. The light-stations, light-vessels, and buoys of the district were inspected, with two exceptions, at least three times. Fuel was supplied to light-stations requiring it during July and August, 1901. All stations were supplied with stores in May and June, 1901. The gas buoys were examined and filled at least three times during a year. There are no day or unlighted beacons in this district.

The engineering work consists in making repairs and improvements at various light-stations, the more extensive being improvements made at the Buffalo light-house depot, New York; rebuilding the west pier at Conneaut, taking down the brick tower and repairing the keeper's dwelling at Cleveland, Ohio; raising and repairing the outer pierhead beam at Big Sodus, New York; replacing the fourth-order lantern of the Marblehead, Ohio, light-tower with a third-order lantern; making plans for the South Buffalo light-station, New York; light-house structures for Cape Vincent breakwater, New York; keeper's dwelling at Port Clinton, Ohio, and completing plans and making a contract for the construction of the Toledo Harbor light-station, Ohio.

LIGHT-STATIONS.

41. *Ogdensburg, St. Lawrence River, New York*.—In the tower an iron hand rail has been put up in the stairway as far as the top of the

stone wall of the old part of the tower, and materials have been left at the station to extend the rail to the lantern when the new brickwork of extension has become sufficiently hard. The entrance opening in the lantern floor has been enlarged to provide more head room. The inside face of the walls was plastered with cement mortar and painted white. Various repairs were made.

56. *Tibbetts Point, St. Lawrence River, New York.*—Some 175 feet of walk about the keeper's dwelling was built. The fog-signal steam boilers were tested to 150 pounds cold-water pressure. Various repairs were made.

The following recommendation, made in the Board's last three annual reports, is renewed:

The families of the two keepers are living in one small dwelling, much to the discomfort of both. A new dwelling for the assistant keeper is much needed. It is estimated that a proper structure could be built for not exceeding \$3,500, and it is recommended that an appropriation of this amount be made therefor.

62. *Oswego breakwater, entrance to Oswego Harbor, Lake Ontario, New York.*—In September, 1900, the color of the tower was changed from brown to white. The striking apparatus of the fog-bell was repaired.

64-65. *Fair Haven, entrance to Little Sodus Bay, Lake Ontario, New York.*—Four concrete piers were built under the Outer Pierhead beacon. Minor repairs were made.

66, 67, 68. *Big Sodus, at Sodus Bay, Lake Ontario, New York.*—The outer pierhead beacon was raised 15 feet. The timber bed sills were replaced with four concrete piers, built up from the water level to the beacon sills. On June 10, 1901, the characteristic of the light was changed from sixth-order fixed white to fourth-order fixed white, varied by a white flash every two minutes. Various repairs were made. On the same date the main light on the bluff, three-fifths of a mile westerly of the entrance to Big Sodus Bay, was permanently discontinued. The oil house was moved near the inner pierhead beacon.

69, 70. *Genesee, Charlotte Harbor, New York.*—On November 22, 1900, the 6-inch steam whistle was removed and a 10-inch whistle was put in its place. Various repairs were made.

75. *Fort Niagara, Niagara River, Lake Ontario, New York.*—Various repairs were made.

The following recommendation, made in the Board's last two annual reports, is renewed:

The Niagara River is difficult to enter in bad weather and on dark nights. A small light at the mouth of the river where it empties into Lake Ontario would materially decrease the danger in making the port and would increase the value of the Niagara River as a harbor of refuge. At present there is no refuge for vessels drawing more than 10 feet of water on the south shore of Lake Ontario between the Genesee River and Port Dalhousie except the Niagara River. It is estimated that a tower 25 feet high, located on United States land, showing a light covering the range of visibility needed by mariners, would cost about \$2,000 to establish. The Board therefore recommends that an appropriation of \$2,000 be made therefor.

— *Strawberry Island Cut and channels leading thereto, Niagara River, New York.*—Vessels bound down the Niagara River to points below the International Bridge must make their way through the narrow natural channel between the main shore and the shoals about the head of Strawberry Island and the artificial cut made by the Government through Strawberry Island Shoal. These channels are marked by buoys which can not be put down until some time, usually several

weeks, after navigation opens in the spring, as they would be carried away by floating ice. Moreover, they are liable at any time to be shifted by vessels hitting and moving them in the swift currents, and they do not supply the need that sometimes exists for running the channels in the nighttime. Four range lights are necessary as additional aids for running these channels, two in the vicinity of Germania Park to mark the channel leading from the International Bridge to the Strawberry Island Cut and two on the lowland lying between the Erie Canal and the river to the north of and marking the axis of the cut. It is estimated that these four lights can be established for the sum of \$13,000, which includes the cost of the land required for sites for the structures. The Board therefore recommends that an appropriation of this amount be made therefor.

79. *Buffalo Breakwater (north end) Lake Erie, New York.*—The installation of the new water-tube boilers, in duplicate, was completed, and the apparatus was ready July 28, 1900, to resume the steam fog-signals, which had been temporarily discontinued on June 20, 1900. Various repairs were made.

81, 82. *Buffalo Breakwater, southern entrance, north and south sides of new breakwater, Buffalo Harbor, Lake Erie, New York.*—The establishment of light and fog-signal stations at this place was authorized by the act approved June 6, 1900.

The plans for the light towers and fog-signal house, including foundations and pile protection work, were completed. Subsequently conditions developed during two severe storms which made it necessary to materially modify the completed plans to provide greater strength. The modified plans are now practically completed.

83, 84. *Dunkirk, Dunkirk Harbor, Lake Erie, New York.*—The characteristic of the main light was changed from fixed white varied by a white flash every 90 seconds to fixed white varied by a white flash every 45 seconds. The pierhead beacon was twice repaired where damaged by storms, and planks were laid on the breakwater connecting the beacon with the shore to provide a walk for the light-keeper where the decking was washed away by seas. About 196 feet of wire fence and 100 square feet of cement walk were built. Various repairs were made.

85. *Presqu'île Peninsula fog-signal station, west of entrance to Presqu'île Bay (Erie Harbor), Lake Erie, Pennsylvania.*—The color of the fog-signal house was changed from brown to white. Minor repairs were made.

87, 88, 89. *Presqu'île Pierhead, Erie Harbor, entrance to Presqu'île Bay, Lake Erie, Pennsylvania.*—The characteristic of the fog-bell signal was changed. The bell is now struck by machinery, a single blow every 10 seconds instead of every 20 seconds, as heretofore. Various other repairs were made.

92, 93. *Conneaut, entrance to Conneaut Harbor, Lake Erie, Ohio.*—About 380 running feet of elevated walk was built on the west pier. Braces were put in the lanterns of both beacons to steady the lenses. An oil reservoir, with lamp connections, was put into the rear beacon lantern to enable the light to burn five days in cases of emergency, when the light can not be reached by the keeper. The characteristic of the rear range light was changed on October 1, 1900, from white to red. Various repairs were made.

94, 95. *Ashtabula, entrance to Ashtabula Harbor, Lake Erie, Ohio.*—A set of new fifth-order lamps was provided for the front range light. Various minor repairs were made.

99, 100, 101, 102. *Cleveland, entrance to Cleveland Harbor, Lake Erie, Ohio.*—The west pier beacon was rebuilt on the new concrete pier. During the progress of the work the fourth-order light was discontinued and the light was shown from a lens lantern. An iron oil house was built on the pier near this beacon. About 100 tons of large stone was placed on the north side of the west breakwater light to lessen the vibration of the beacon. Various repairs were made.

105. *Vermilion, entrance to Vermilion Harbor, Lake Erie, Ohio.*—About 186 feet of elevated walk on the west pier was rebuilt. Minor repairs were made to the keeper's dwelling.

106. *Huron, entrance to Huron Harbor, Lake Erie, Ohio.*—The exterior of the tower was covered with sheathing and metal shingles, and painted white below the balcony. Miscellaneous minor repairs were made.

110, 111. *Sandusky Bay outer range, entrance to Sandusky Bay, Lake Erie, Ohio.*—A life rail was put around both cribs at a height of about 5 feet above the water. Iron ladders were put up, one on the easterly face of each crib, and a timber outrigger, extending 10 feet from the crib, was put up on the southerly side of the front crib. A brick 1,200-gallon cistern was built in the cellar. The color of the keeper's dwelling and both towers was changed from yellowish drab to white. Various repairs were made.

112, 113. *Sandusky Bay inner range, on the bar, entrance to Sandusky Bay, Lake Erie, Ohio.*—An iron life rail was put up around the rear beacon crib about 5 feet above the water level. The color of the keeper's dwelling and both towers was changed from a yellowish drab to a bright yellow, and the foundation crib was painted red. Various minor repairs were made.

115. *Marblehead, west of entrance to Sandusky Bay, Lake Erie, Ohio.*—The fourth-order lantern was replaced with the third-order lantern taken from the discontinued main light-tower at Erie, Pa., to increase the power of the light. Some 43 loads of cinders were placed on the driveway leading to the public highway for its improvement. Minor repairs were made.

119. *Green Island, on the west end of Green Island, Lake Erie, Ohio.*—The characteristic of the light was changed from fixed white varied by a red flash every minute to flashing alternately red and white with intervals of thirty seconds between the flashes. The clockwork of the revolving apparatus was furnished with a new drivewheel and adjusted to run five hours. Various repairs were made.

121. *Port Clinton, entrance to Port Clinton Harbor, Lake Erie, Ohio.*—Plans were made for rebuilding the keeper's dwelling, and the work was begun under contract. The light-house reservation was resurveyed and four stone monuments provided for marking its boundaries.

125. *Toledo Harbor, entrance to Straight Channel, Maumee Bay, Lake Erie, Ohio.*—The act of July 1, 1898, appropriated \$37,500 for a light and fog-signal station to mark the outer end of the main channel entrance to Toledo Harbor, and authorized a contract for its completion not to exceed \$75,000. Owing to a large increase in the cost of materials required in the work, and failure to obtain any proposi-

tion from contractors to construct the station according to the approved plans within the limits of the authorized expenditure, the act approved June 6, 1900, authorized a contract for the work at a cost of \$100,000. Under authority contained in these three acts, measures were taken to build the station. The work was twice advertised and a contract for \$84,700 was made in October, 1900, covering all the buildings and foundation crib, the work to be completed by December 31, 1901. The act approved March 1, 1901, appropriated \$52,500 for completing the station, making a total of \$90,000 appropriated. This contract does not include provision for the illuminating and fog-signal apparatus. These, with the necessary expenses of superintendence and other incidental expenses, will require, it is estimated, a further appropriation of \$10,000 to complete the station. The Board therefore recommends that an additional appropriation of \$10,000 be made.

At the close of the fiscal year ending on June 30, 1901, the contractors had completed the crib substructure, sunk it at the site, and filled it with the specified materials of stone, gravel, and sand. Some 350 cubic yards of concrete had been molded in face and inner blocks for the concrete superstructure ready to be taken to the site and put in place. Much progress was made in getting out the structural iron required, and arrangements were made that other materials be delivered when wanted on the work.

133. Detroit River, mouth of the Detroit River, Lake Erie, Michigan.—Both of the steam fog-signal boilers were tested. Various repairs were made.

The act approved June 6, 1900, appropriated \$1,000 for the purchase of land and the erection of a boathouse on the mainland for the use of the keepers of the Detroit River light-station. A lot containing about an acre on the Huron River, near its mouth, was purchased. The boundaries of this lot were marked by stone monuments. The lot was fenced, and on it a boathouse was built containing room for three boats. The upper part was finished to provide the keepers with temporary sleeping and cooking conveniences when needed.

140, 141. Grosse Isle north channel range, Detroit River, Michigan.—The following recommendation, made in the Board's last seven annual reports, is renewed:

The site was paid for and the beacons were completed, but funds have not permitted the erection of a dwelling. The beacons are situated near the north end of the island, where the houses are almost exclusively owned and occupied by summer residents, and there is no place where a keeper can live within a reasonable distance. The construction of a dwelling is therefore essential to the proper maintenance of the lights. A suitable dwelling may be constructed for \$3,500, and an appropriation of that amount is recommended for that purpose.

142, 143. Grosse Isle south channel range, Detroit River, Michigan.—The following recommendation, made in the Board's last eight annual reports, is renewed:

A new dwelling is needed for the keeper of this range. He is now living in a dwelling on Mamajuda, which is not only unsuitable for the purpose, but is too far away. It is deemed dangerous for the keeper to live on the side of the channel opposite to the lights. A proper dwelling can be built on a foundation partially in the water for not exceeding \$5,000, and it is recommended that this amount be appropriated for that purpose.

144, 145. Mamajuda range, Detroit River, Michigan.—The front beacon was leveled up on its pile foundation, and 100 running feet of

the elevated walk connecting the beacon with the shore was leveled and strengthened. Various repairs were made.

146, 147. *Grassy Island south channel range, Detroit River, Michigan.*—Some 35 cords of riprap stone was placed on slopes of the embankment between the beacons. Various repairs were made.

148, 149. *Grassy Island north channel range, Detroit River, Michigan.*—Some 5 cords of riprap stone was placed on slopes of the embankment between the beacons to prevent washing away of earth. Various repairs were made.

150, 151. *Ecorse range, Detroit River, Michigan.*—The following recommendation, made in the Board's last six annual reports, is renewed:

The lights of this range are located on the flats, in water about 3½ feet deep, in front of a wide marsh. The nearest place where a keeper could reside is in the village of Ecorse, about three-fourths of a mile distant in a direct line. If he should live there, it would be necessary to row fully a mile. This would be quite difficult at times, as the ice forms and remains in the shallow water, while the main channel is open. The light-house reservation, which is 100 feet wide and about 700 feet long, is entirely submerged, and the bottom is so soft that a secure foundation can be had only upon piles protected with riprap stone. It is indispensable to the proper care of this station that the keeper live on its site. This can be made possible only by the erection here of a keeper's dwelling. It is estimated that a suitable one can be erected for \$5,000, and it is recommended that an appropriation of this amount be made therefor.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

44. Cross Over Island, N. Y.
49. Rock Island, N. Y.
52. Carleton Island, N. Y.
58. Sacketts Harbor, N. Y.
59. Galloo Island, N. Y.
61. Stony Point, N. Y.
63. Oswego, N. Y.
71. Braddock Point, N. Y.
73. Thirty-Mile Point, N. Y.
76-77. Niagara River range, N. Y.

78. Horseshoe Reef, N. Y.
80. Buffalo, N. Y.
91. Presqu'île, Pa.
96, 97-98. Fairport, Ohio.
103-104. Black River, Ohio.
123. West Sister Island, Ohio.
124. Turtle Island, Ohio.
130-131. Manhattan Range, Ohio.
132. Munroe, Mich.

LIGHT-VESSELS.

134. *Bar Point Shoul light-vessel, No. 59, mouth of Detroit River, Michigan.*—This wooden light-vessel, which was built in 1893, is of 105 gross and 56 tons net burden, and has a steam fog-signal. She used 179 gallons of oil and 10 tons of coal. She was removed from her station December 10, 1900, at the close of navigation, and laid up for the winter at the light-house depot at Detroit. She was replaced on her station on April 8, 1901, at the opening of navigation. The tubes of the fog-signal boiler are beginning to wear, and some of them have been plugged. A mainsail, cover, and awnings were supplied. Minor repairs were made.

135. *Limekiln Crossing (south) light-vessel, No. 64, Detroit River, Michigan.*—This wooden scow, used as a light-vessel, was built in 1893; is of 18 gross and 10 tons net burden, and has a bell struck by hand as a fog-signal. She was removed from her station December 10, 1900, at the close of navigation, and was laid up for the winter at the Detroit light-house depot. She was placed on her station at the

opening of navigation, April 8, 1901. She was hauled out and opened, when the hull was found to be quite rotten; but the need of the services of the vessel being great, only urgent repairs were made. On May 19, 1901, she was run into and forced from her station by a Canadian barge, but she was replaced on her station in a few hours, as she was not so much injured as to make it necessary to go into port for repairs.

136. *Linekiln Crossing (north) light-vessel, No. 65, Detroit River, Michigan.*—This wooden scow, used as a light-vessel, was built in 1893, is of 18 gross and 10 tons net burden, and has a bell struck by hand as a fog-signal. She was removed from her station on December 11, 1900, at the close of navigation, was laid up for the winter at the Detroit light-house depot, and was placed on her station on April 8, 1901, at the opening of navigation in the spring. She was hauled out, and urgent repairs only were made.

— *Relief light-vessel, No. 63.*—This wooden scow, built in 1893, is of 18 gross and 10 tons net burden. She is in good condition and is now at the Detroit light-house depot, with a shipkeeper on board, ready for service. She was overhauled, when necessary repairs were made.

FOG-SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

56. *Tibbetts Point, St. Lawrence River, New York.*—This 10-inch steam whistle, in duplicate, was in operation some 227 hours, and consumed about 9 tons of coal.

59. *Galloo Island, Lake Ontario, New York.*—This 10-inch steam whistle, in duplicate, was in operation some 254 hours, and consumed about 14 tons of coal.

69. *Genesee Range (front), Lake Ontario, New York.*—On November 22, 1900, the 6-inch steam whistles were removed and replaced by 10-inch steam whistles. They were in operation some 221 hours, and consumed about 8 tons of coal.

79. *Buffalo Breakwater (north end), Lake Erie, New York.*—This 10-inch steam whistle was in operation some 383 hours, and consumed about 22 tons of coal. The installation of the duplicate water-tube boilers, in place of the single locomotive boiler, was finished on July 20, 1900, and the sounding of the whistle, which had been temporarily discontinued, was resumed.

85. *Presqu'île, Presqu'île Peninsula, Lake Erie, Pennsylvania.*—This 10-inch steam whistle was operated some 48 hours, and consumed about 2 tons of coal. On September 22, 1900, the color of the fog-signal house was changed from brown to white.

94. *Ashtabula Range (front), Lake Erie, Ohio.*—This 10-inch steam whistle, in duplicate, was in operation some 424 hours during the year, and consumed about 24 tons of coal.

100. *Cleveland, west breakwater (east end), Lake Erie, Ohio.*—This 10-inch steam whistle, in duplicate, was in operation some 968 hours, and consumed about 47 tons of coal.

125. *Toledo Harbor, entrance to Straight Channel, Maumee Bay, Lake Erie, Ohio.*—The work of establishing a steam fog-signal here has begun.

133. *Detroit River, Lake Erie, Michigan.*—This 10-inch steam whistle, in duplicate, was in operation some 99 hours, and consumed about 10 tons of coal.

134. *Bar Point Shoal light-vessel, No. 59, Lake Erie, Michigan.*—This 6-inch steam whistle was in operation some 127 hours, and consumed about 4 tons of coal. A leaky tube caused the signal to be temporarily discontinued on April 8, 1901. Temporary repairs were made and the whistle was again sounded on June 21, 1901.

FOG-SIGNALS OPERATED BY CLOCKWORK.

Fog-bells operated by clockwork are in use at the following-named stations: Oswego breakwater; Fairhaven range, front; Genesee range, front; Buffalo breakwater, north end, New York; Presqu'île pierhead, Pennsylvania, and at Cleveland, west breakwater, east end, Ohio. They are in good condition. At Genesee range, front, Buffalo breakwater, north end, and Cleveland, west breakwater, east end, the bells are used only when the steam whistles are temporarily disabled or until steam can be raised in the fog-signal boilers when a fog comes on unexpectedly. A bell is struck by hand on the Bar Point Shoal light-vessel, No. 59, when the steam whistle is temporarily disabled.

BUOYAGE.

The important changes in the buoyage were the establishment of East Charity Shoal buoy, No. 2, a red second-class nun; the interchange with Charity Shoal gas buoy, No. 2; the breaking adrift of Galloo Island Shoal gas buoy, No. 1, and which was so badly damaged that it could not be replaced before the reopening of navigation; the establishment of 11 spar buoys in Niagara River and 8 spar buoys in Sandusky Bay. There are 23 gas buoys in the district and the tender *Haze* can not properly care for more than 25 and attend to the other work. The gas for the lighted buoys in the St. Lawrence River and Lake Ontario is procured at Syracuse by shipping it in two large store-holders to Cape Vincent, from whence it is distributed by the tender. The gas for the lighted buoys in Lake Erie is procured at Detroit and is similarly distributed. The buoys in Lake Erie and part of those in the Niagara River are cared for by the tender *Haze*. The buoys in the St. Lawrence River, Lake Ontario, and part of those in the Niagara River are cared for by contract. The caring for buoys by contract is not entirely satisfactory, but the one tender can not do all the buoy work of the district. The general condition of the buoyage is good. Only a few buoys have been displaced or have gone adrift during the year. The gas buoys are occasionally dragged out of place or injured by passing vessels or tows, and spar buoys are cut adrift or broken off in the same way. On the closing of navigation winter buoys are used for marking the important points, and the regular aids to navigation are removed until the opening of navigation in the spring.

LIGHT-HOUSE DEPOTS.

Rock Island, St. Lawrence River, New York.—This depot, consisting of a substantial and commodious wharf and buoy shed, provided with an iron car and tracks extending from the wharf front to interior of the buoy shed, is used for storing the buoys, sinkers, and other buoy appliances for St. Lawrence River and Lake Ontario when they are not in use, and for storing the spare buoys and appliances.

Buffalo, Lake Erie, New York.—The act approved March 3, 1899, appropriated \$50,000 to repair and enlarge this light-house depot. Two contracts were made, one for rebuilding 170 feet of the wharf along the river front, enlarging, deepening, and rebuilding the walls of the slip for use of tenders; the other for constructing foundations, storehouses, sheds, tramroad tracks, retaining walls, floors and pavements, water drainage system, and inclosing fence. The work covered by these contracts was completed. Much other work remained to be done to finish and fit up storehouses, including lamp shop, with shutters, elevators, machinery, and special conveniences. This work is now practically completed. The rebuilding of the timber harbor wall along the river front has not yet been completed, and it is still impracticable for the tenders to reach the depot.

The old depot is in poor condition and too small for the purpose, but it is still used for storing supplies. The spare buoys are stored near and around it, but neither the buoys nor the supplies can be removed until the tenders can reach the new depot.

Erie (Presqu'île Pierhead), Lake Erie, Pennsylvania.—This depot was painted by the crew of the *Haze*. It is so small that it will not take the two gas buoys from Erie Harbor, which must now be stored on the wharf. The spar buoys, with their appliances, are stored here during the winter in addition to the spare buoys and appliances.

Sandusky Bay, Cedar Point, Lake Erie, Ohio.—This light-house depot and wharf are in good condition. They were painted by the crew of the *Haze*. The buoys and appliances from Sandusky Bay and from about the islands to the northward and westward are stored here in addition to the spare buoys and appliances.

Maumee Bay, Lake Erie, Ohio.—This buoy shed is in fair condition and was painted by the crew of the *Haze*. The pile foundation at the northern end was crushed by moving ice last winter. The spar buoys from Maumee Bay are stored here during the winter, in addition to the spare buoys and appliances.

LIGHT-HOUSE TENDERS.

Haze.—This wooden screw steamer, which was built in 1876, is of 316 tons gross and 200 tons net burden, and is used as an inspection and supply vessel and as a buoy tender. She was docked May 22, 1901, and her under-water hull was found in good condition. Her boilers were inspected and repaired during the winter. She has received a new boat and another is nearly ready for delivery. The *Haze* was laid up in winter quarters at the Detroit light-house depot on December 20, 1900, and resumed work March 15, 1901. She steamed some 7,093 miles, with an expenditure of about 308 tons of coal.

Tender for the Tenth light-house district.—By the act approved March 3, 1901, \$120,000 was appropriated for a new steam tender for buoyage, supply, and inspection in the Tenth light-house district. The necessary calculations have been made and work will soon be commenced in the drafting room on her plans and specifications.

Warrington.—This wooden steam screw barge was built in 1868 and is of 257 tons gross burden. From December 4, 1900, to May 1, 1901, she was laid up in winter quarters at the Buffalo light-house depot. During the remainder of the year she was employed in making

inspections of the light and fog-signal stations, transporting and handling materials, and transferring employees connected with various works of repairs and improvement. She steamed some 5,796 miles and consumed about 433 tons of coal. She was put in dry dock twice during the year for repairs. Some 51 feet of keel was renewed; the old rudder post was cut out and fastened to the forward side of the rudder to form a counterbalance; the iron shoe was replaced by one of steel; the propeller wheel was removed, the keyway was dressed and provided with a new key; 30 braces and 60 crowfeet were replaced by larger ones in the boiler over the combustion chamber; 20 rivets were renewed and the seams were calked along the side of the boiler. A new hydraulic steering apparatus was provided. Various minor repairs were made.

ELEVENTH DISTRICT.

This district extends from the mouth of the River Rouge, Detroit, Michigan, to the westerly end of Lake Superior. It embraces aids to navigation on the United States shores and waters of Lakes Erie, Huron, and Superior, the upper part of the Detroit River, the St. Clair and St. Marys rivers, and that part of the Straits of Mackinac lying to the eastward of a line drawn across the straits just to the westward of Old Mackinac Point light-station, Michigan.

Inspector.—Commander J. C. Wilson, United States Navy.

Engineer.—Maj. (now Lieut. Col.) Thomas H. Handbury, Corps of Engineers, United States Army.

There are in the district—

Light-houses and beacon lights, including 23 post lights.....	232
Light-vessels in position.....	3
Lighted or unlighted beacons.....	1
Signals operated by steam.....	31
Signals operated by clockwork.....	5
Lighted buoys in position.....	28
Unlighted buoys in position.....	3
Lighted or unlighted buoys in position.....	368
Steamer <i>Marigold</i> , buoy tender, and for supply and inspection.....	1
Steamer <i>Amaranth</i> , for construction and repair.....	1
Launch <i>Lotus</i> , for construction and repair.....	1

LIGHT-STATIONS.

153-154. *Windmill Point range, Detroit River, Michigan*.—Some 13 feet of sidewalk at the front range and 115 running feet at the rear range were renewed and various repairs were made.

156-157. *Isle aux Peches range, Lake St. Clair Twenty-foot Channel, Michigan*.—Both clusters of this range were carried away by the ice in the spring of 1901, and were reestablished on April 29, 1901. The driving of the piles was completed and the lights were exhibited on April 28, 1901. The upper woodwork of the beacons, consisting of platforms, targets, and masts, was constructed, framed, and painted at the Detroit light-house depot, and on April 29, 1901, was placed in position and the lantern carriages were fitted and hung. Each beacon consists of a hexagonal cluster of six piles, 40 feet long, driven 3 feet to centers, the front cluster being driven in about 19 feet of water and the rear cluster in about 10 feet. The focal plane of the front light is 18 feet above lake level and the rear light 38 feet. Each cluster has a triangular pine waling of 6-inch by 10-inch timber near the water line and an upper waling of 6-inch by 10-inch timber.

The following recommendation made in the Board's last annual report is renewed:

The fact that the piles on which these two lights stand are always carried away by ice in the winter, and during the summer are once or twice run down by passing vessels, shows the need for structures of some strength and permanence which will serve as day beacons for the range and from which lights can be exhibited at night. The present arrangement has proven to be inadequate, as the light is not visible at times when it should be under reasonable atmospheric conditions. Something larger and more substantial is required.

The rear beacon should be placed as near the national boundary line as practicable. It should be a skeleton tower about 72 feet high, made of angle iron, resting upon a crib filled with stone and concrete for a foundation. This will be about 20 feet square, standing in from 8 to 10 feet of water. A suitable disk should be attached for a day beacon and a strong lens-lantern light should be exhibited from it at night.

The front beacon should be placed about a mile in front of the rear beacon, both being in the line of the axis of the dredged Twenty-foot Lake St. Clair Channel. It will thus stand in from 18 to 20 feet of water. A suitable riprap foundation, with its top about 5 feet above the bottom of the lake, should first be prepared. Upon this a crib 36 feet square should be built and carried up to a height of about 7 feet above the surface of the water. This should be filled with stone, and it should be plated with iron in the vicinity of the water line. On the top of this should be built a suitable keeper's dwelling, surmounted with a tower from which to exhibit a fourth order light. It is estimated that this can be done at a cost not exceeding \$12,000 and the Board recommends that an appropriation of this amount be made therefor.

158-165. Lake St. Clair Twenty-foot Channel, Michigan.—During the winter of 1899 the tops of the four cribs that were placed on the edge of this channel, from which compressed gas lights were exhibited were carried away by the ice. These lights were replaced by compressed gas buoys, with an additional gas buoy on the opposite side of the channel. In the fall of 1900 the top was replaced on one of these cribs in a thorough manner to test the practicability of repairing the remaining ones so that they could be made to withstand the immense ice pressure, and to utilize them for the purpose for which they were built. In the early part of the winter this top was carried off.

At the beginning of the season of navigation, in 1901, the same arrangement as last season was made for lighting this channel with compressed gas buoys and the crib wrecks were marked with danger buoys. It is evidently not practicable to utilize these cribs, and in their present condition they are more or less dangerous to vessels passing in the vicinity. They should be removed at the first opportunity.

It is believed that the two lines of gas lights exhibited from buoys on the edges of this channel, taken in connection with the Isle aux Peches range will be the most satisfactory method practicable for lighting this channel.

168. St. Clair Flats Canal (lower), Michigan.—The material required to reline the interior of the lantern was purchased, and delivered at the station by the tender *Amaranth*.

169. St. Clair Flats Canal (upper), Michigan.—The station walks were renewed by the keeper. The material required to reline the interior of the lantern was purchased, and delivered at the station by the tender *Amaranth*.

179. Middle No. 8, St. Clair River, Michigan.—The pile cluster from which this light is shown, carried away by the ice in the early spring of this year, was rebuilt. The light was reestablished on May 21, 1901.

183. Russell Island Beacon, St. Clair River, Michigan.—The top of the foundation crib at the upper end of the shoal at the head of Russell Island was carried away by ice in April, 1900, to a depth of 6 feet below water. The light has been shown since from the old tripod structure on the east shore, near the upper end of the island. A pile cluster, consisting of 3 piles 32 feet in length, with a platform, was established near the head of this island on June 26, 1901. The cluster was carried away on June 30, 1901. It is believed that this was done by a steam tug towing a raft.

187. Fort Gratiot, Lake Huron, Michigan.—The construction of a new fog-signal house to contain the duplicate fog-signal machinery,

which work was in progress at the close of the last fiscal year, was finished during July. The boilers and engines were placed, and the fitting up of the plant was completed. The old boilers were replaced with new ones, but the old machinery, which was in fair condition, was repaired and again put in service. The new structure is built of brick, and is 22 feet wide and 40 feet long, with a half pitch gable roof. The station grounds were graded, two rows of barbed wire were fastened to the top of the board cap of the fence surrounding the buildings, and various repairs were made.

190. Sand Beach, harbor of refuge, east entrance, north main light, Lake Huron, Michigan.—The wooden hand railing surrounding the lantern was replaced with one of wrought iron, and various repairs were made.

194. Pointe aux Barques, Lake Huron, Michigan.—The illuminating apparatus was overhauled and repaired at the light-house district lamp shop, and returned to the light-station. The illuminating apparatus was examined and tested, and various repairs were made.

195. Port Austin Reef, Lake Huron, Michigan.—The work of rebuilding the light-tower and fog-signal was practically finished. The structure consists of a square, buff-brick tower, four stories high, with a living room and kitchen. The focal plane of the light from the base of the tower is 54 feet. The tower is connected to the fog-signal building. The first story of the tower and all of the fog-signal house show an inside finish of brick, and the second and third stories of the tower are plastered. The circular watch room of the tower is iron and is lined with oak ceiling. The trimmings, floors, and stairs of the tower are of oak. The main deck, circular watch room, lantern deck and lantern are all of cast iron. The proper measures were taken to perfect the title to the land purchased in 1875 at Port Austin for light-house purposes.

196. Tawas, Michigan.—The cribs of the tramway leading to the landing wharf were leveled up, the drain on the west side of the signal house was extended, the water-supply well was deepened 4 feet, and a shore protection 112 feet in length, built of logs, was constructed near the site of the signal house. A telephone system was established between the fog-signal building and the keeper's dwelling. A survey of the reservation was made and the work platted, and various repairs were made.

The following recommendation made in the Board's last annual report is renewed:

Now that a fog-signal is established at this point, and an assistant keeper is needed for its care and operation, a dwelling for his use is a necessity. It is estimated that such a dwelling, with a small barn and other necessary outhouses, can be built for \$5,000. The Board therefore recommends that an appropriation of this amount be made therefor.

198. Charity Island, Lake Huron, Michigan.—A brick oil house with a capacity of 360 gallons was erected, and various repairs were made.

200, 201. Saginaw River range, Lake Huron, Michigan.—The west wall of the assistant keeper's dwelling, near the front light, was taken down and rebuilt, and various repairs were made. The grounds around the buildings were graded, some 636 running feet of walk leading from the dwelling to the shore was built, the paint was cleaned

off the rear range tower, the surface was roughened with pointed tools, all soft and defective bricks were replaced with good ones, and the entire structure was stuccoed with Portland cement mortar about one-half an inch thick. Various repairs were made.

204. *Thunder Bay Island, Lake Huron, Michigan.*—The repairs to the assistant keeper's dwelling, the material for which was delivered to the station last year, were commenced in the early part of July, 1900. A cellar was dug, in which a concrete floor was laid, two brick piers were built in the cellar, drainage was provided, and an outside entrance, with brick areaway, was built on the north side. The interior partitions were taken down, relathed, and replastered. Repairs were made to the keeper's dwelling. The illuminating apparatus was overhauled and repaired at the district lamp shop. Material for an oil house was purchased and delivered at the Detroit light-house depot.

— *Middle Island, Lake Huron, Michigan.*—The following recommendation, made in the Board's last five annual reports, is renewed:

A light and fog-signal are now needed here, both in order to make available the harbor of refuge behind Middle Island, the only one in the vicinity having sufficient depth of water for the modern deep-draft lake vessels, and to mark a turning point in the regular course of vessels bound up or down the coast. It is proposed to establish a light and fog-signal station on Middle Island. This it is estimated can be done for \$25,000, and it is recommended that an appropriation of this amount be made therefor.

209. *Presque Isle, Lake Huron, Michigan.*—A 10-inch steam whistle, to replace a broken one, was delivered here.

211. *Spectacle Reef, Lake Huron, Michigan.*—This station is on an isolated reef in the northern end of Lake Huron, and is about 10 miles from the nearest point of land. The base of the tower is placed on the highest point of the solid rock of the reef in about 11 feet of water. The rock slopes down from this point, is irregular on the surface, and is covered with bowlders and gravel. Here the tower is 32 feet in diameter. To prepare the work to receive the tower and to give protection to the material and workmen while it was in process of erection, a timber crib was prepared on shore at Scammons Harbor, about 16 miles distant, was towed out, and was sunk on the reef. The crib was 92 feet square, outside dimensions. It was divided into two rows of compartments on each side. These were 10 feet square. There was a square space in the center of the crib 48 feet by 48 feet in plan. Inside of this there was a water-tight cofferdam within which the tower was constructed. All the outside cribbing was for the purpose of protecting this from the effects of storms and to afford space for the building material and plant. It was a part of the original project that this crib should be all cleared away when the tower was completed, therefore no special pains were taken to place it upon bed rock or to give it strength or design beyond what was necessary for the temporary purpose to which it was devoted.

It was originally intended that the material of the tower should be granite, but the failure of the contractor to supply it forced a change in this respect, and a limestone was adopted. This material can not resist for any great length of time the continued pounding and surging of the lake ice in the winter season.

As an afterthought to the original design the fog-signal feature of the station was introduced. The top space of the crib was necessary to accommodate the machinery for this, and after the tower was finished it was decided that the cribs should remain.

The crib was sunk into place during the season of 1871. The compartments, or pockets, excepting the large center square, were well filled with stone. The waves dashing against the crib undermined the outside edges, and more or less of the stone in the pockets tumbled out. This was from time to time replaced.

The life of the superstructure of timber cribs of this character on the northern lakes is from twelve to fifteen years. In 1889, some eighteen years after this crib had been put in place, the superstructure was in the last stages of decay, and the substructure was in bad condition. At that time about \$18,000 were spent in repairs to the crib, and on other needed repairs at the light-station. Since then there have been current repairs and filling in of the pockets, costing in the aggregate between \$7,000 and \$10,000.

It is now twelve years since the timber of the superstructure was last thoroughly overhauled and renewed. For some time the station has been under surveillance with the view to its thorough repair, and to placing some structure around the base of the tower of a more permanent character than the present crib work, not only for its permanent protection, but to afford accommodation for the fog-signals.

On a recent visit to this station a careful inspection of the crib was made. The timbers of the superstructure, especially the walls of the large square in which the tower stands, were found to be in about the last stages of decay. The outer timbers, exposed to the action of the waves, have so little life left in them that it is difficult to get bolts or spikes to hold. The timbers of the substructure, although not decayed, have been subject to such continued shock by the ice that they are becoming loose, and some are entirely gone. In some places there are side spaces between the bottom timbers and the lake bottom, through which the stones are falling from the crib. The condition of affairs has now become so serious that to relieve it requires radical measures. In view of the condition of the substructure, which was not designed for permanency, but has now been in service for thirty years, it is deemed unadvisable to expend more money upon its repairs or upon a renewal of the superstructure.

Instead it is recommended that a structure be built described somewhat as follows: The large square in the center of the crib has not been filled with stone. Taking advantage of this fact there should be placed in this a large cylinder made of steel plates. It should be two semicylinders with radius 23 feet 6 inches, separated by two plain surfaces 10 feet 8 inches in length. These plates should rest firmly upon the bed rock. After clearing off the rock in the space between the cylinder and the tower, it should be covered with Portland cement concrete to a height of 15 feet above the lake surface. From the bottom to the water surface the concrete should be put in place through the water, in large boxfuls, about 1 cubic yard, with as little disturbance as possible. Above the water surface it should be properly tamped. Space should be left in this concrete mass for storage rooms for coal and for other supplies necessary to the station. On the top provision should be made for the fog-signal machinery, hoisting derricks, engines, and other appliances. After all is finished the old crib can be removed by dredging so as to permit boats to come alongside with supplies.

The cylinder should be of one-half inch sheet steel. Below the water surface it should be made in vertical panels 3 feet wide and about

11 feet long. On the vertical edges of these there should be angle irons by means of which they can be bolted together when put in place. This work should be done by divers. The crib walls will serve as stays to prevent the cylinder from bulging outward or getting out of shape while being filled with concrete. Bolts with bent ends should extend back into the concrete to hold the plates in place. Above the water line the cylinder should be constructed of long horizontal plates one-half inch thick and about 5 feet wide, riveted together.

In plan the northern semicylinder will have its center in that of the base of the tower, the center of the southern being 10 feet 8 inches to the south. This arrangement is necessary in order to make room for the fog-signal houses. The contents of three pockets of the interior row on that side will have to be removed. The stone now in the crib pockets can be largely used in making the concrete required. The work can be carried on in the summer season, irrespective of prevailing weather conditions. If commenced soon a considerable quantity of the material may be stored on the crib. This can also serve as a platform from which to carry on the work.

The following is submitted as an approximate estimate, which it is believed will cover all expenses. The material and machinery are figured upon as in place, at what is believed to be a liberal unit of cost.

Protection pier.

Clearing away old work in center square and preparing rock for concrete . . .	\$750
116,500 pounds steel casing, at 10 cents	11,650
1,450 cubic yards concrete, at \$12	17,400
200 feet chain railing, at \$1	200
Metal work, stairs, grating, snubbing posts, pipes, water-closet, etc	700
Services of tender, two months, at \$2,000	4,000
Diving outfit	1,000
	<hr/>
	35,700
Clearing away old pier	2,500
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	38,200

Fog-signals.

38,500 pounds steel, plate angles, studding, rafters, etc., at 10 cents . .	\$3,850
Windows, doors, fittings, etc.	400
Boilers and engines	3,000
Hoisting engine	750
Boat cranes	1,000
Services of tender, one month	2,000
	<hr/>
	11,000
Total	49,200
Add 10 per cent for contingencies	4,900
	<hr/>
	54,100

It is estimated that this work can be done for a sum not exceeding \$54,100, and the Board recommends that an appropriation of that amount be made therefor.

214. *Cheboygan Crib, Straits of Mackinac, Michigan.*—The color of the tower was changed from brown to white.

215-216. *Cheboygan River range, Straits of Mackinac, Michigan.*—The steel tower to replace the old timber beacon of the rear range was completed and the erection of the structure was finished in December, 1900. The tower is a square, pyramidal skeleton, 75 feet high, is pro-

vided with a ladder, lamp carriage and appurtenances, and a day mark, and is built on six brick foundation piers. A small frame lamp and cleaning house was built at the base of the tower, and the old timber beacon was taken down. The act approved July 1, 1898, appropriated \$1,750 for the purchase of additional land for the front range. The question of its ownership is now pending in court. The color of the combined tower and dwelling of the front range was changed from brown to white, and various repairs were made.

218. *Round Island, Straits of Mackinac, Michigan.*—A frame boat-house was built and provided with boat ways. A landing crib was built, sunk in position, filled with ballast stone, and the east side of the crib was ripped. A plank walk was laid connecting the crib with the boathouse, and a walk was laid from the pier to the boathouse.

222. *Detour, Lake Huron, Michigan.*—Some 550 running feet of walk was relaid. An addition was made to the boat landing by building two cribs, which were sunk in position, filled with ballast stone, and decked. The boathouse was raised. Vessels leaving Lake Huron and entering the St. Marys River are often detained in a dense fog in this locality, while in the St. Marys River the weather conditions are clear and free from fog. A new characteristic, or special signal, used to inform vessels approaching the river went into effect on June 10, 1901. Various repairs were made.

223. *Frying-Pan Island, St. Marys River, Michigan.*—The boat-house was rebuilt and repairs were made to the dwelling and walks.

258. *East Side Middle, No. 12, Hay Lake Channel, St. Marys River, Michigan.*—In the spring of 1900 the crib was carried away by the ice. On June 12, 1901, a scow, painted red, was moored on the site formerly occupied by the crib and a fixed red-post lantern light was suspended from a cross arm on a red wooden upright.

264, 265. *Frechette Point Range, Hay Lake Channel, St. Marys River, Michigan.*—Specifications are being prepared for making changes in the beacons of this range to mark the center of the existing channel.

275, 276. *Vidal Shoals Channel Range, St. Marys River, Michigan.*—The rear tower of this range was provided with a track and sliding carriage for raising and lowering the lens lantern, and the positions of the lights as formerly shown were reversed. In making this change the characteristic of the revolving apparatus installed in the front range tower was changed from flashing red every minute to flashing red every 40 seconds and the apparatus was overhauled and repaired. The work of changing the rear light of this range to a fixed red incandescent electric light of 125 candlepower was in progress at the close of the fiscal year.

— *St. Marys Falls Canal (south pier) St. Marys River, Michigan.*—This light was discontinued on November 1, 1900, being no longer needed to mark the end of the pier, which is lighted by two red lights, one above the other. These lights are maintained under the direction of the War Department as necessary for the operation of the canal and locks.

280. *Brush Point Beacon, St. Marys River, Michigan.*—A pile beacon for the exhibition of a fixed white lens-lantern light was established during the month of August, 1900, in 6 feet of water on the reef making off from this point, southeasterly side of St. Marys River. The beacon consists of a triangular cluster of four piles, the center one,

from which the light is shown, being 12 feet above lake level. The light was shown on August 20, 1900. The cluster was carried away by the ice in the spring of 1901, and was rebuilt and the light was reestablished on May 31, 1901. On June 30 the color of the light was changed from white to red.

281, 282. *St. Marys River (lower range), Michigan.*—The foundation of the front beacon of the range was repointed, a protection crib, 15 feet square, was built around it and filled with stone, and 484 running feet of walk was renewed. Various repairs were made.

283, 284. *St. Marys River (upper range), Michigan.*—The boat landing was extended by building two new cribs, which were filled with stone and decked. The old cribs were refilled with stone and redecked, the outer crib was ripped up, and new boatways were built. Various repairs were made.

285, 286. *Head of St. Marys River Range, Michigan.*—The acts approved July 1, 1898, and June 6, 1900, provided the sums of \$1,000 and \$2,700, respectively, for the erection of proper beacons and a suitable dwelling for the keeper. Title to the site for the front beacon was obtained by purchase, and to the site upon which the rear beacon is erected by condemnation proceedings. Plans and specifications of the buildings were prepared, and the materials were purchased and delivered at the site. Building operations were commenced at the site on May 13, and the work was practically completed at the close of the year. The beacons are square, pyramidal skeletons. The front beacon is 48 feet and the rear beacon 72 feet high to the focal plane. The front range tower is erected near the extreme point of the site. The rear range tower is erected on the shore, 970 feet southeast of the front range. The dwelling consists of two rooms, with a kitchen and lean-to woodshed. The other structures are of painted wood. A sand and gravel walk was laid across the swamp and leading to the rear tower, and the grounds around the dwelling and that portion of the site extending from the beach to the rear line of the Government holdings was cleared. The building of a landing crib was in progress when the year closed. The range will probably be lighted early in July.

315. *Point Iroquois, Lake Superior, Michigan.*—The repairs were completed. The new barn was painted, a well and well house were provided, 550 feet of wire fencing was erected. Various repairs were made.

316. *Whitefish Point, Lake Superior, Michigan.*—A tramway leading from the fog-signal house to the lake shore was built with two portable sections, one for use at the fog-signal building, and the other at the lake shore. Various repairs were made.

The characteristic of this light was changed on October 12, 1900, from flashing white every five seconds to flashing white every ten seconds.

A weather signal tower was erected here by the Department of Agriculture.

— *Crisps Point, Lake Superior, Michigan.*—The following recommendation, made in the Board's last five annual reports, is renewed:

This is a dangerous point for vessels bound down the lake in thick weather. These vessels all try to make Whitefish Point, but a slight variation in their course from the nearest point of departure will run them ashore near Crisps Point. Several wrecks have occurred here. It is proposed to establish a light and fog signal station on or near Crisps Point. This it is estimated can be done for \$18,000, and it is recommended that an appropriation of this amount be made therefor.

319. *Big Sable, Lake Superior, Michigan.*—Material was delivered at the station for repairing the fog-signal water-supply crib, for renewing the boxing of the water-supply pipes and stringers of the tramway, for repairing the roof of the keeper's dwelling, providing drains and sewers and for making other repairs.

320. *Grand Island, Lake Superior, Michigan.*—In accordance with advertisement, certain lots of land no longer required for light-house purposes, were sold at auction on June 10, 1901, at Munising, Mich.

324. *Marquette, Lake Superior, Michigan.*—The boat landing and the fog-signal water-supply crib were rebuilt, and various repairs were made. Sealed bids were asked by advertisement, and but one was received, for the purchase of a strip of land on the western border of this light-house site, which is no longer needed for light-house purposes.

325. *Marquette Breakwater, Lake Superior, Michigan.*—The color of the tower was changed from brown to white.

333-334. *Portage Range, Portage River and Lake, Michigan.*—The frame tower for the front beacon of this range was completed and a plank walk connecting it with the rear range beacon was built. The dwelling was provided with a lightning conductor and a well was driven. Various repairs were made. A brick oil house was commenced and the walls of the structure were carried to a height of about 4 feet. The site of the structure being low and swampy, a crib foundation of plank was built, on which the oil house was erected. A plank walk was laid from the oil house to the walk connecting the ranges.

335-358. *Portage River and Lake Lights, Michigan.*—The work of rearranging these lights, establishing three additional pile clusters between Atlantic Point and Rouleau Point ranges, and making repairs to the dwelling at Princess Point, was completed. Fourteen of the old clusters were either rebuilt or relocated, and three new clusters were established at Cole Creek, Harrington Island, and High Point. The structure at High Point, destroyed by fire on October 11, was temporarily reestablished on October 17 and permanently rebuilt in May, when a lamp house was provided. A lamp house was provided for light No. 12.

359-360. *Portage Lake ship canals range, Michigan.*—The front light was moved from the south end of the east pier to about 450 feet from its southerly end, and the rear light from 600 feet to 750 feet N. by E. $\frac{1}{2}$ E. in rear of the front light. A lamp and cleaning house was provided for the station.

362. *Manitou, Lake Superior, Michigan.*—The boat landing in the north bay was extended. Another crib was placed opposite the boat landing for anchorage for the mudsills of the boat ways. Some 82 feet of boat ways were built. A landing wharf, composed of a bulkhead 12 feet wide and 20 feet long, in the south inlet in front of the boat-house, was built of logs, filled with stone and decked. The old crib built last year, and stranded in the south bay, was floated, thoroughly repaired, placed in the rear of the bulkhead, and extended 50 feet to reach the shore. Mudsills were also provided at this point. The walk leading from the shore end of the wharf to the south fog-signal building was rebuilt. The color of the tower was changed from brown to white. Various repairs were made.

363. *Gull Rock, Lake Superior, Michigan.*—A retaining wall of rubble masonry, 40 feet long, was built at the northeast corner of the

dwelling, and a coping of Portland cement mortar was placed on the new and also on the old work. The inner crib of the north boat landing was removed, and a new crib placed in the same position and filled with stone. An additional crib 60 feet in length was constructed for anchorage for the mudsills for the new boat ways. Various repairs were made.

368-369. *Eagle Harbor Range, Lake Superior, Michigan.*—The keeper's dwelling was raised 2 feet, the foundation wall was built up the same height, the cellar was filled in to a height of 2 feet, and a new concrete floor was laid. The barn was replaced with a two-story structure. Some grading was done on the roadway between the ranges and around the other structures. Various repairs were made.

370. *Eagle River, Lake Superior, Michigan.*—This is supposed to be a coast light and guide to Eagle River. As a coast light it can not now be regarded as of any importance, being only a lens lantern and located back from the general line of the coast. It is of no use as a guide to the entrance to Eagle River, because the mouth of that river is now entirely blocked up with sand. An old dock which was once in use at this point is now rotten, and has not had a pound of freight on it for years. There is no commerce in the locality, and no vessels of any draft, except the light-house tenders with supplies go near the place. There is a rocky reef about one-half mile offshore, extending for several miles along the coast, which makes it dangerous to approach. For several years past no repairs have been made to this dwelling on account of the probability that the light might be discontinued. As a consequence, it is in a far advanced state of decay. If the station is to be continued, all the woodwork of the roof, doors, windows, out-houses, board walks, and fences should be renewed.

The following statement and recommendation was made in the Board's annual reports for 1894, 1896, 1897, 1898, and 1899:

The moving of this light to Sand Hills, at a cost not to exceed \$20,000, was authorized by the act approved February 15, 1893, but no appropriation therefor has yet been made. Recommendation is made that the amount named be appropriated.

The following recommendation, made in the Board's annual report for 1900, is renewed:

It is now estimated that \$25,000 will be required for this work, and it is recommended that an appropriation of that amount be made therefor.

374. *Ontonagon, Lake Superior, Michigan.*—The low and swampy places in the roadway leading from the dwelling to the public highway were filled in and the walk leading from the dwelling to the pier was rebuilt. Material for an oil house was purchased. Various repairs were made.

375. *Ontonagon pierhead, Michigan.*—The iron beacon was completed and was delivered on July 31, 1900, at the Detroit light-house depot. The beacon is a square, pyramidal frame of steel, 26 feet 10 inches high to the focal plane. It is surmounted by a lantern deck and lantern of cast iron. The tower is erected on the outer end of the west pier, and is provided with a watch room. The fixed red light of the fourth order was shown on November 10, 1900. Some 70 feet of new walk was laid. Various repairs were made.

376. *Outer Island, Lake Superior, Michigan.*—Fog-signal house No. 2 was built on the east side of building No. 1, and the two structures were connected. The old plant of signal No. 1 was removed, the new

plant was placed, and the steam and water pipes were changed as needed. The landing pier was rebuilt and refilled with stone, and the structure was redecked. A crib was sunk in the gap at the rear of the old pier, and filled with stone. A tramway was built from the brow of the bluff to the signal house. Various repairs were made.

380. *Raspberry Island, Lake Superior, Wisconsin.*—The broken timbers of the crib comprising the L at the outer end of the landing wharf were removed, and a new crib was sunk at the outer end of the wharf and filled with stone. Material for an oil house was purchased and delivered at the Detroit light-house depot. Various repairs were made.

381. *Devils Island, Lake Superior, Wisconsin.*—The illuminating apparatus for the new light tower was received in April at the light-house depot. A hoisting engine and derrick, together with a lot of material of various kinds for repairs, were taken to the station by the tender *Amaranth*, June 22, 1901. A working party was landed at the same time. About 1,000 feet of the roadway to connect the boathouse with the tower and other buildings of the station was cleared of timber and underbrush, a woodshed for the storage of fuel for the fog-signal plant was built, the stone for a small building for the protection of the hoisting engine at the north end of the island was quarried and dressed, the engine was removed, and work on the foundation of the new structure was commenced. The foundation for the derrick was commenced, two sections of portable track, each 20 feet long, were built, and the work of installing the third-order flashing lens in the new tower was commenced. This work is being paid for from the unexpended balance of the appropriation for Devils Island (Wisconsin) light station.

382. *Sand Island, Lake Superior, Wisconsin.*—The material required for the erection of an oil house at this station was purchased and delivered at the Detroit light-house depot.

385-395, 398-407. *Superior and St. Louis bays, Wisconsin and Minnesota.*—Eighteen of the post lights in these bays, which were carried away by the ice during the past winter, were reestablished, and two new clusters were constructed—one a fixed white light on the southerly side of Duluth Harbor basin, about 2,350 feet southwest from the rear tower of the Duluth Range, and the other a fixed red light on the easterly side of Superior Front Channel, at the entrance of East Gate basin, about 1,300 feet southerly from the East Gate basin post light No. 7. Rice Point Channel post light No. 3 was knocked down and destroyed by the steamer *Admiral* on November 3, 1900, and was rebuilt on November 16 at the expense of the owners of the steamer.

396-397. *Duluth Range, Lake Superior, Minnesota.*—A temporary structure was built on the new south pier, and one of the fog-signal plants was transferred from the old pier and installed therein. A pyramidal tower 25 feet high was erected at the outer end of the pier and a mast 37 feet long was set up at the inner end. A small lamp house was built near the inner end of the pier. The old elevated walk, 700 feet long, was removed from the old pier and was repaired and erected on the new pier. Two concrete blocks, to form independent foundations for the two rear legs of the permanent rear beacon, were built and placed near the inner end of the pier. A skeleton iron tower some 60 feet high, for the rear beacon of this range, was delivered at the light station. Detailed plans and specifications for a combined

light tower and fog-signal building were prepared and a contract made and work was commenced in June, 1900. The erection of the permanent rear range tower by hired labor was also commenced. Various repairs were made.

— *Rock of Ages, Lake Superior, Michigan.*—The following recommendation was made in the Board's annual reports for 1896, 1897, 1898, and 1899:

During the season of southerly and westerly winds many vessels bound to and from Duluth, by taking a course along the north shore of the lake and in lee of Isle Royale, are enabled to run when the lake is too rough for the more southerly course. A light and fog signal on the dangerous rocks off the westerly end of Isle Royale would be a valuable aid to these vessels. It is therefore proposed to establish a light and fog-signal station on the Rock of Ages, off the western end of Isle Royale. This it is estimated, can be done for \$50,000, and it is recommended that an appropriation of that amount be made therefor.

The following recommendation made in the Board's annual report for 1900 is renewed:

It is now estimated that it will cost \$125,000 to establish this light and fog signal and the Board recommends that an appropriation of this amount be made therefor.

This estimate and recommendation is in accordance with that made by the Secretary of the Treasury in his letter of January 4, 1900, to the chairman of the House Committee on Appropriations.

REPAIRS.

Repairs more or less extensive were made at the following-named stations:

- | | |
|---------------------------------------------------------------------------------------|----------------------------------------------------|
| 152. Belle Isle, Mich. | 327. Big Bay Point, Lake Superior, Mich. |
| 155. Windmill Point, Mich. | 329. Stannard Rock, Lake Superior, Mich. |
| 189. Port Sanilac, Mich. | 330. Sand Point, Mich. |
| 191-192. Sand Beach, east entrance, south light and north entrance, west light, Mich. | 331. Portage River, Mich. |
| 203. Sturgeon Point, Mich. | 361. Mendota, Lake Superior, Mich. |
| 206. Alpena, Mich. | 365-366. Copper Harbor Range, Lake Superior, Mich. |
| 213. Cheboygan, Mich. | 367. Eagle Harbor, Lake Superior, Mich. |
| 217. Bois Blanc, Mich. | 372. Portage Lake Ship Canal Pierhead. |
| 224. Pipe Island, Mich. | Lake Superior, Mich. |
| 251. North Side Upper No. 6, Hay Lake Channel, Mich. | 373. Fourteen Mile Point, Lake Superior, Mich. |
| 317-318. Grand Marais, Harbor of Refuge, Mich. | 378. Lapointe, Wis. |
| 326. Granite Island, Lake Superior, Mich. | 383-384. Superior Pierhead Range, Wis. |
| | 408. Two Harbors, Lake Superior, Minn. |

LIGHT-VESSELS.

166. *Grosse Pointe light-vessel, No. 10, upper end of 20-foot dredged channel, Lake St. Clair, Michigan.*—This wooden vessel, of about 362 tons gross burden, was built in 1878 for a stone barge and used by the engineer for carrying stone during the construction of Stannard Rock light-station. In 1887 she was turned over to the light-house inspector, when she was so altered as to be used as a light-vessel, was fitted with a fog bell, and was placed at this point. She was removed from her station on December 15 and replaced on May 1. Sufficient repairs were made last winter to keep her together.

By act of June 6, 1900, the \$15,000 appropriated by the act of July 1, 1898, for a steam light-vessel at Poe Reef, Straits of Mackinac,

Michigan, was reappropriated for the construction of a light-vessel for Grosse Pointe. Plans for the new light-vessel are now being prepared. The old vessel is so deteriorated as to be useless for any further service in the district.

168. Lake Huron light-vessel, No. 61, head of St. Clair River, Lake Huron, Michigan.—This wooden light-vessel is of about 107 tons gross burden, is fitted with a steam fog-signal, and is well adapted for her position. While repairs were being made on Poe Reef light-vessel, No. 62, she was placed on the station of that vessel on May 19, and was withdrawn upon the completion of the repairs to light-vessel No. 62 and replaced on her own station on July 3, 1901. Slight repairs were made to the hull.

212. Poe Reef light-vessel, No. 62, entrance to South Channel, Straits of Mackinac, Michigan.—This wooden light-vessel was built in 1893 and is of about 107 tons gross burden and similar in all respects to light-vessel No. 61. At the opening of navigation she was towed by the tender *Marigold* from Cheboygan to Detroit, where she was extensively repaired. She was returned to her station on July 1, 1901.

— *Martins Reef light-vessel, northwestern end of Lake Huron, Michigan.*—The following recommendation was made in the Board's annual reports for 1896, 1897, 1898, and 1899:

It is proposed to place a light on Martins Reef as an aid to the great and increasing traffic between the mouth of the St. Marys River and the Straits of Mackinac. Since the great development of steel works at Chicago, Milwaukee, and Joliet, and the discovery of new and cheap ores suitable for making steel on the northerly shore of Lake Superior, the commerce passing from the mouth of the St. Marys River through the Straits of Mackinac into Lake Michigan has increased with rapidity. It is several times greater than it was five years ago. The vessels carrying ore from Duluth and Two Harbors to Lake Michigan ports are the largest in the lake-marine class. These vessels pass close to the dangerous Martins Reef, hence a light-vessel there is much needed. It is estimated that a proper light-vessel can be built and placed there for \$15,000, and it is recommended that an appropriation of this amount be made therefor.

The following recommendation was made in the Board's annual report for 1900 and is renewed:

In the original estimate for this light-vessel a wooden vessel was contemplated. From information since received, and in view of the exposed and dangerous position she would occupy, it is now believed that it would be more economical to build this light-vessel of steel, with auxiliary steam power, as she could then not only place and maintain herself on her station, but she could also tow the Poe Reef light-vessel to and from her station, and thus effect a saving of about \$150 a year. It is estimated that a suitable steam light-vessel for Martins Reef, with auxiliary steam power, can be built for \$35,000. This Board therefore recommends that the proper measures may be taken to obtain an appropriation of this amount therefor.

Relief light-vessel for the Ninth and Eleventh light-house districts.—There are in use in the Ninth light-house district four light-vessels and in the Eleventh light-house district three light-vessels, and recommendation has been made that an additional one be provided; but there is no relief vessel to take the place, in either of the two districts, of one which may become disabled.

A suitable light-vessel should be built for use as a relief light-vessel in the two districts. She could be kept at Charlevoix, Mich., light-house depot, where she would be available for use in either district. This relief light-vessel, which should be of steel, it is estimated can be built for \$30,000, and it is recommended that an appropriation of this amount be made therefor.

FOG-SIGNALS OPERATED BY STEAM OR HOT-AIR ENGINES.

187. *Fort Gratiot, Michigan.*—This 8-inch steam whistle was in operation some 121 hours and consumed about 8 tons of coal.

188. *Lake Huron light-vessel No. 61, Michigan.*—This 6-inch steam whistle was in operation some 164 hours and consumed about 8 tons of coal.

190. *Sand Beach harbor of refuge, Michigan.*—This 10-inch steam whistle was in operation some 182 hours and consumed about 17 tons of coal.

195. *Port Austin Reef, Michigan.*—This 10-inch steam whistle was in operation some 145 hours and consumed about 6 tons of coal.

196. *Tawas, Michigan.*—This 10-inch steam whistle was in operation some 348 hours and consumed about 19 tons of coal.

204. *Thunder Bay Island, Michigan.*—This 10-inch steam whistle was in operation some 266 hours and consumed about 16 tons of coal.

209. *Presque Isle, Michigan.*—This 10-inch steam whistle was in operation some 430 hours and consumed about 16 tons of coal.

210. *Forty-mile Point, Michigan.*—This 10-inch steam whistle was in operation some 274 hours and consumed about 7 tons of coal.

211. *Spectacle Reef, Michigan.*—This 10-inch steam whistle was in operation some 214 hours and consumed about 11 tons of coal.

212. *Poe Reef light-vessel, No. 62, Michigan.*—This 6-inch steam whistle was in operation some 211 hours and consumed about 13 tons of coal.

213. *Cheboygan, Michigan.*—This 10-inch steam whistle was in operation some 221 hours and consumed about 13 tons of coal.

218. *Round Island, Michigan.*—This 10-inch steam whistle was in operation some 162 hours and consumed about 10 tons of coal.

222. *Detour, Michigan.*—This 10-inch steam whistle was in operation some 252 hours and consumed about 18 tons of coal.

315. *Point Iroquois, Michigan.*—This 10-inch steam whistle was in operation some 531 hours and consumed about 28 tons of coal.

316. *Whitefish Point, Michigan.*—This 10-inch steam whistle was in operation some 546 hours and consumed about 40 tons of coal.

319. *Big Sable, Michigan.*—This 10-inch steam whistle was in operation some 262 hours and consumed about 15 tons of coal.

324. *Marquette, Michigan.*—This 10-inch steam whistle was in operation some 225 hours and consumed about 18 tons of coal.

327. *Big Bay Point, Michigan.*—This 10-inch steam whistle was in operation some 326 hours and consumed about 17 tons of coal.

328. *Huron Island, Michigan.*—This 10-inch steam whistle was in operation some 174 hours and consumed about 11 tons of coal.

329. *Stannard Rock, Michigan.*—This 10-inch steam whistle was in operation some 248 hours and consumed about 12 tons of coal.

362. *Manitou, Michigan.*—This 10-inch steam whistle was in operation some 417 hours and consumed about 26 tons of coal.

367. *Eagle Harbor, Michigan.*—This 10-inch steam whistle was in operation some 438 hours and consumed about 36 tons of coal.

372. *Portage Lake Ship Canal pierhead, Michigan.*—This 10-inch steam whistle was in operation some 230 hours and consumed about 17 tons of coal.

373. *Fourteen-Mile Point, Michigan.*—This 10-inch steam whistle was in operation some 86 hours and consumed about 3 tons of coal.

376. *Outer Island, Wisconsin.*—This 10-inch steam whistle was in operation some 231 hours and consumed about 13 tons of coal.

378. *Lapointe, Wisconsin.*—This 10-inch steam whistle was in operation some 200 hours and consumed about 10 tons of coal.

381. *Devils Island, Wisconsin.*—This 10-inch steam whistle was in operation some 241 hours and consumed about 12 tons of coal.

383. *Superior pierhead (front), Wisconsin.*—This 6-inch steam whistle was in operation some 432 hours and consumed about 25 tons of coal.

396. *Duluth (front), Minnesota.*—This 10-inch steam whistle was in operation some 563 hours and consumed about 25 tons of coal.

408. *Two Harbors, Minnesota.*—This 10-inch steam whistle was in operation some 406 hours and consumed about 2 tons of coal and 46 cords of wood.

412. *Passage Island, Michigan.*—This 10-inch steam whistle was in operation some 463 hours and consumed about 22 tons of coal.

DAY OR UNLIGHTED BEACONS.

There is but one unlighted beacon in this district, and this is situated on the southern extremity of the reef off Stannard Rock, Lake Superior, Michigan.

BUOYAGE.

The buoys marking the channels in Detroit River, Lake St. Clair, St. Clair River, Lake Huron, and Lake Superior were cared for by the tender *Marigold*. Those in Saginaw River, St. Marys River, Portage Lake and River, Michigan, and Superior and St. Louis bays, Wisconsin and Minnesota, were cared for by contract. The buoys cared for by the tender and those in Saginaw River were taken up at the close and replaced at the opening of navigation. Those cared for by contract, excepting those in Saginaw River, were allowed to remain in position during the winter, as thus far it is found to be impracticable to raise them after navigation is closed by the ice. These buoys were overhauled, painted, and numbered at the opening of navigation.

Experiments have been carried on during the past year in making concrete sinkers to be used in place of stone and iron sinkers. The iron sinkers are expensive and the stone sinkers are of a clumsy shape, with sharp edges and angles, and when used for mooring buoys on the edges of shallow dredged channels they are frequently dragged by rafts and vessels into the middle of the channel, thereby becoming dangerous to passing vessels, whose drafts are in many cases almost equal to the depth of the channel. The concrete sinkers referred to are made in galvanized iron molds of the size and modified shape of the hemispherical iron sinkers now in use in the Light-House Service. They are recessed on the bottom in order to give greater holding capacity, and the bolt on the top is countersunk, so there are no edges or angles exposed. It is intended to experiment with some of them by making a blowhole, running completely through from top to bottom, in order that where permanent sinkers are required they may be buried in mud bottoms by the use of an ordinary ship's hose and force pump. It is believed that thus buried their holding power will be sufficient to replace in many instances the expensive and heavy iron sinkers now in use.

In weight these sinkers are equal to about one-third that of the iron sinkers of a corresponding size. They can be made by any laborer in any buoy depot, and those of the size of the 2,500-pound iron sinkers and which weigh between 800 and 1,000 pounds, cost \$1.60 each. The stone sinkers which have been used in this district vary in cost from \$1 to \$5 each. Besides affecting a material saving in the expenses of buoyage, these sinkers possess the following-named advantages over those now in use: The ability to make them as required, thereby avoiding the necessity of keeping a large stock on hand; the ability to make them where required, thereby saving the expense of transportation; their greater holding capacity per cubic foot; the greater safety to passing vessels in shallow channels marked by buoys moored to them. Experiments with these sinkers will be continued.

LIGHT-HOUSE DEPOTS.

Detroit, Mich.—This is the principal depot for this district and is used for the reception and storing of buoys, stores, and supplies, and the making of buoys and sinkers. The tenders receive their cargoes of supplies and stores, while the two basins serve as winter quarters for the tenders and light-vessels of the Tenth and Eleventh light-house districts. The wharf was repaired. A plank floor was laid in the store-house at the outer end of the wharf. Ten white-oak fender piles were driven at the outer end of the wharf, six at the outer face and two at each end, and nine spring piles were driven at the upper and lower inside and outside corners. The spring piles were fastened together with 1-inch wire rope and securely stapled. Three of the old piles, which interfered with the driving of the new piles, were drawn, seven piles were cut down and trimmed, and four new mooring cleats were placed on the wharf. The work of getting out oak fender chocks and putting them in place was in progress at the close of the year.

Sugar Island, St. Marys River, Mich.—By the act approved July 1, 1898, an appropriation of \$15,000 was made for establishing a light-house and buoy depot in the vicinity of Sault Ste. Marie, Mich. The material for the construction of the wharf and the various buildings for this depot was transported to the site by the tender *Amaranth*, and the construction of the buildings under contract was commenced in July and was completed on October 25, 1900, in accordance with the terms of the contract. A wharf was built 152 feet long and 20 feet wide. A brick oil house was erected on concrete footings. A frame buoy shed was built on brick piers set on stone footings laid in Louisville cement mortar. The exterior of this dwelling is covered with corrugated iron. A custodian's brick dwelling, 30 feet 6 inches by 33 feet 6 inches in plan, was built. It contains a cellar, parlor, dining room, kitchen, pantry, hall, three chambers, a bathroom, and three closets. A frame barn and a frame boathouse were built. The material for a fence to inclose the site was provided. This depot was built for a store and supply depot for the St. Marys River and vicinity, and was completed and put in operation on November 1, 1900.

LIGHT-HOUSE TENDERS.

Marigold.—This iron screw steamer was built in 1890, and has a displacement of 587.43 tons. She received repairs to the main and auxiliary engines, including new piston rods, valves, valve seats, piston

rings, steam connection, and water tank. The vessel was docked, the propellers were changed, and the rudder bearings were repaired. The flanges around the hawse pipes were calked, and the lignum vitæ was renewed in the stern bearings. The main-deck gangway gates and rails were renewed and the deadlight was repaired. The bottom of the tender was cleaned and painted. The *Marigold* was employed in inspecting light-houses and delivering supplies and fuel to light stations and fog signals. She steamed some 12,742 miles and consumed about 733 tons of bituminous coal, delivering supplies to 234 lights and 31 steam fog-signal stations.

Lotus.—This wooden steam screw launch, of about 15 tons gross burden, laid up at the Detroit light-house depot, is rotten and worthless and unfit for service. It has been inspected and condemned, but was not expended at the end of the year.

The launch of the Amaranth.—This launch was laid up at the Detroit depot during the year. The interior was rebuilt, the boiler and engine being moved $21\frac{1}{2}$ inches nearer the stern, new sills were provided, and the cockpit and the seats were rebuilt. The engine was overhauled and repaired, and the propeller wheel was key-seated and refitted.

Amaranth.—This steel screw steamer was built in 1892, and is of about 744 tons gross burden. The worn-out smoke stack was replaced, a new floor was laid in the forward hold, the fenders and deck hatches were renewed, new gratings were provided for the hatches, a concrete floor was laid in the crews' bathroom, and a new bath tub was provided; the lining of the doors of the boilers was renewed, metallic packing was provided for the high-pressure valve rods, and a worn-out sprocket wheel of the steam windlass was renewed. The tender visited nearly all of the light-stations in the district, delivering more or less material for construction and repairs to most of them. She delivered the material for the construction of the buildings for the St. Marys River light-house and buoy depot; was employed in connection with the work of rebuilding the top of one of the cribs of the Lake St. Clair twenty-foot channel; in removing the light-house structures from the old south pier, and the erection of temporary structures on the new pier at Duluth Harbor, Minnesota; in transferring the rear beacon of the old Duluth range to Superior pierhead range light-station; in transporting material and working parties to Gull Rock, Birch Point range, Devils Island, and Raspberry Island light-stations; in transporting the contractor, with workmen and material, to Duluth range light-station for the construction of a combined light-tower and fog-signal building; and in delivering the metal work for the towers erected at Cheboygan rear range and Birch Point range light-stations, and the metal work for the iron beacon now being built at Duluth rear range light-station. During the year the tender delivered at 122 light-stations 1,325 tons of material. In doing this she steamed about 8,685 miles and consumed some 780 tons of coal. The tender was in winter quarters from December 6, 1900, to April 19, 1901, during which time about 120 tons of coal were consumed. The boilers of the tender were inspected and tested in October, 1900, and the boilers subjected to a pressure of $172\frac{1}{2}$ pounds, the safety valves being set at a working pressure of 115 pounds. The gasoline launch of the tender was equipped with an 8-horsepower steam boiler and engine.

Tender for St. Marys River, Michigan.—The following recommendation was made in the Board's last annual report:

It has been found that an extra steam light-house tender is needed in the Eleventh light-house district, to be used in and near St. Marys River, in consequence of the increase of commerce passing through that river and the great necessity for keeping its aids to navigation in the best possible condition. This steamer should be of iron, with a specially strengthened bow for ice crushing. It should be about 100 feet long, should draw not more than 6 feet of water, and should be fitted with a first-class hoisting engine and derrick. It is estimated that such a tender can be built for not exceeding \$60,000, and the Board therefore recommends that an appropriation of this amount be made therefor.

The system of maintaining and caring for buoys by contract is unsatisfactory, and at times is a menace to navigation in these waters. The contractors are supposed to make daily patrols of the waters under their contract, but the Board is unable to ascertain whether this is done or not. A tender for the St. Marys River could patrol the waters by day and night, thus ascertaining that the numerous beacons, gas and other buoys now in charge of laborer-keepers and contractors are properly attended and lighted.

The present tender, the *Marigold*, is too small to do the work of the whole district. At present there are 234 lights and 31 steam fog signals to supply, the latter consuming about 600 tons of coal and 25 cords of wood per annum. The *Marigold* can carry about 115 tons of fog-signal coal each trip, but it is necessary for her to make at least five trips to carry this fuel, besides making two supply trips during the season of navigation. This, with the buoy work in the lakes and rivers, taxes her capacity to the utmost limit. A tender for the St. Marys River could distribute supplies for those stations, fill the gas buoys and beacons in the river and its vicinity, thus relieving the *Marigold* of this work.

The Board, in its Annual Report for 1900, estimated that a tender for the St. Marys River could be built at a cost not exceeding \$60,000 and recommended that an appropriation of this amount be made therefor. That estimate was made in 1898. It is now believed, in view of the great increase in the cost of material and labor which has occurred since that estimate was made, that a suitable tender could not be built for less than \$75,000. The Board therefore now recommends that the appropriation therefor be increased to this amount.

TWELFTH DISTRICT.

This district extends from the boundary between California and Mexico to the boundary between California and Oregon. It embraces all aids to navigation on the seacoast, bays, rivers, and other tidal waters of California.

Inspector.—Commander Uriel Sehree, United States Navy.

Engineer.—Maj. (now Lieut. Col.) C. E. L. B. Davis, Corps of Engineers, United States Army.

There are in this district—

light-houses and lighted beacons, including 4 post lights.....	57
light-vessel in position.....	1
day or unlighted beacons.....	48
fog-signals operated by steam or oil engines.....	17
fog-signals operated by clockwork.....	11
whistling buoys in position.....	16
bell buoys in position.....	11
other buoys in position.....	75
steamer <i>Madroño</i> , buoy tender, and for supply and inspection.....	1
steam launch of <i>Madroño</i>	1
steam launch <i>Hazel</i> , for construction and repairs.....	1

NOTE.—The number preceding the name of a light-station in the Twelfth and thirteenth districts is that by which it is designated in the List of Lights and Fog-signals on the Pacific Coast of the United States, corrected to February 1, 1901.

LIGHT-STATIONS.

2. *Ballast Point, San Diego Bay, California*.—The assistant keeper's dwelling at this station will be occupied by the keeper of the beacon lights of the harbor. It is proposed to furnish him with an alcohol-vapor launch for use in attendance on the lights, and also to build small boat-ramps on which to take the launch from the water when necessary.

3, 6, 7. *Beacon No. 2, Beacon No. 6, and Diamond Beacon, San Diego Bay, California*.—A contract was let for rebuilding on a systematic plan the beacons in San Diego Harbor, which calls for the rebuilding of three four-pile beacons to replace the lighted beacons mentioned. It is proposed to renumber all the beacons, both lighted and unlighted, from the entrance up the harbor after the new structures are completed.

— *San Clemente Island, seacoast of California*.—This island, reserved for light-house purposes by Executive order dated September 1, 1854, not being at present used by the Light-House Establishment, was leased for a term of five years to the San Clemente Wool Company for grazing purposes.

8. *Deadman's Island Breakwater Beacon, entrance to San Pedro Harbor, California*.—A four-pile beacon surmounted by a lamp house carrying a five-day red lens lantern was built on the end of the breakwater making off from Deadman's Island, at the southerly entrance to San Pedro Harbor. The light was first shown on April 11, 1901.

9. *San Pedro Harbor Beacon, No. 4, San Pedro Harbor, California*.—The beacon, originally an unlighted beacon, was arranged to

carry a post lantern from an arm attached to it. The light, which is red, was first shown on April 11, 1901.

— *Point Dume, northern entrance to Santa Monica Bay, California.*—An appropriation of \$63,000 was made by act approved March 3, 1901, for the purpose of establishing a light and fog-signal at this point. The President of the United States by Executive order dated January 26, 1867, reserved a light-house site at Point Dume, but as this land was included within the lines of a Spanish grant made prior to the cession of California to the United States, which grant was afterwards confirmed to the claimants by the courts, it has been decided that the reservation was void, and that the land must be obtained from the present owners. A party is now on the ground making a detailed survey of the land, water rights, and landing desired for the station.

11. *Point Hueneme, entrance to Santa Barbara Channel, California.*—A roadway was built from the town of Hueneme to the light-station over the land purchased last year. Various repairs were made.

12. *Santa Barbara, Pacific Ocean, near Santa Barbara Landing, California.*—Minor repairs were made.

The following recommendation, made in the Board's last four annual reports, is renewed:

The light-house at this station was built in 1856. It is of brick with the outer wall stuccoed. The light is shown from an old-fashioned lantern with triangular-shaped glass, built on top of the dwelling. The structure is unsightly and uncomfortable, and in winter the walls are damp. To put this building in good repair would cost as much, if not more, than to build a new modern structure. This can be done, it is estimated, for not exceeding \$7,500, and it is recommended that an appropriation of that amount be made therefor.

14. *Point Arguello, about 12 miles northwest of Point Conception, seacoast of California.*—This station was commenced in July, 1900, and was completed in January, 1901. It consists of a combined tower and fog-signal building. The light is fixed white of the fourth order, the lens being one formerly in use at Point Hueneme, California, light-station. The light was first shown February 22, 1901. The fog-signal consisting of two first-class sirens operated by compressed air, two 13-horsepower oil engines with air compressors on the same bedplate, and two Crosby signals, was put into operation on June 1, 1901. Accommodation was provided for three keepers and their families, in one double, and one single frame dwelling. A brick oil house of sufficient capacity to hold a year's supply of oil for both the light and the signal was built just behind the tower. Water is taken from a spring on adjoining land distant about 7,000 feet, and led thence by pipe line to two masonry cisterns just within the light-house premises, and from these cisterns it is distributed to the various buildings. The water is delivered by gravity.

The narrow neck of land connecting the sites of the dwellings with the point on which the light and signal house is placed was protected by a stone retaining wall on both sides, and a gas-pipe railing was placed on each side. The roadway and the slopes around the buildings were covered with a coating of gravel. Fences were built around the dwellings and division fences put up. The spring was improved by building a stone wall around it. A blacksmith shop was built and a flag-staff was erected. A barn was built just in the rear of the dwellings.

— *Point Buchon, about 8 miles northwest from Point San Luis Obispo.*—The recommendation was made in the Board's annual reports

for 1897, 1898, and 1899, and several previous ones, that an appropriation be made to establish a light and fog-signal at this point, at an estimated cost of \$33,000.

This point is in San Luis Obispo County, and is 17 miles distant from the town of San Luis Obispo by wagon road and trail. The nearest light-house is Piedras Blancas, about 30 nautical miles to the northward and westward. The point is prominent, and with its outlying rocks is very dangerous to navigators close inshore during a fog, especially as vessels going to and from Port Harford make a sharp turn just off this point.

The following recommendation, made in the Board's annual report for 1900, is renewed:

It is now estimated that it will cost \$40,000 to establish this light and fog-signal station, and it is recommended that an appropriation of that amount be made therefor.

17. Point Sur, seacoast of California.—The roadway from the landing to the top of the rock was completed, and the corduroy road leading over the sand to the main road was straightened and repaired. The spring was deepened and widened to increase the water supply. The stone retaining walls, built to prevent the erosion of the soil on the top of the hill, were completed.

The following recommendation, made in the Board's last five annual reports, is renewed:

The accommodation for the four keepers at this station is insufficient, and it is recommended that an appropriation of \$8,000 be made to build a new cottage.

18. Point Pinos, entrance to Monterey Bay, California.—Some 530 feet of the reservation fence was rebuilt. The act of June 6, 1900, appropriated \$2,000 for the purchase of about 52 acres of land lying between the light station and the ocean and bay of Monterey. Negotiations for this purchase were completed and the deed is now in the hands of the owner of the land, for signature. Minor repairs were made.

19. Santa Cruz, entrance to Santa Cruz Harbor, California.—A fence 246 feet long was built from the east side of the front gate to the corner of the barn. Erosion of the ocean frontage is continually taking place. One of the stone monuments marking a corner of the reservation had to be moved back several feet on account of the washing away of the ground in which it originally stood. Minor repairs were made.

21. Pigeon Point, extreme end of Pigeon Point, seacoast of California.—Bids were asked for building a brick oil house, but all were too high and they were rejected.

The following recommendation, made in the Board's last seven annual reports, is renewed:

There are standing, outside of the light-house site, but close to the fence inclosing the light-house structures, a fisherman's shanty and a hay barn. If a fire should break out in either of these buildings it would endanger the structures of the light-station. It is proposed, in order to obviate this danger, that an additional strip of land to the eastward of the station, say 150 feet wide, be purchased and added to the light-house reservation. This, it is estimated, can be done for not exceeding \$5,000, and it is recommended that an appropriation of this amount be made therefor.

22. Point Montara, above Pillar Point, seacoast of California.—A red lens-lantern light was established on a post 300 feet west by south of the signal house. The light was first shown on November 26, 1900. The fencing around the reservation, destroyed by storm, was rebuilt.

25. Bonita Point, entrance to San Francisco Bay, California.—The landing wharf and derrick were rebuilt and the wharf was enlarged.

The tramway leading up the hill from the wharf, and the steps, were rebuilt. The windmill wrecked by storm was replaced. Various repairs were made.

The dwelling occupied by the assistant keepers, built in 1856, an old stuccoed-brick structure of one and a half stories, does not afford adequate accommodations for the keepers and their families. Plans and estimates for a new double dwelling to cost \$11,905 have been approved. The Board recommends that an appropriation of this amount be made therefor.

26. Fort Winfield Scott, Fort Point, California.—Only slight repairs were made at this station during the fiscal year.

The following recommendation, made in the Board's last two annual reports, is renewed:

The present Fort Point fog-signal, a bell struck by machinery, has long been complained of as inadequate, both in position and power. It is proposed to replace it with a second-class Daboll trumpet, blown by compressed air, and to place it on the top of the northwest bastion of Fort Winfield Scott, Fort Point, California, which will bring it directly over the present location of the bell. It is estimated that this can be done for not exceeding \$7,000, and it is recommended that an appropriation of this amount be made therefor.

The importance of this aid to navigation can not be urged too strongly. The bell can be heard only over a very limited area, frequently not at all until abreast of the fort. An efficient signal should be heard considerably to seaward to give warning of the approach to the vicinity of Fort Point Shoal. The recent disaster to the steamer *Rio de Janeiro* on this reef, involving a loss of over 100 lives, might not have occurred if an efficient signal had been in operation here. It has been decided to increase the power of this light by installing a new fourth-order lens to replace the old one now in use.

27. Line Point, San Francisco Bay, California.—A white lens-lantern light was established and a small oil house was built. The trail leading to the station was damaged by a landslide, and was repaired. Slight repairs were made.

— *Quarry Point, Angel Island, San Francisco Bay, California.*—The following recommendation, made in the Board's last nine annual reports, is renewed:

Various petitions have been received from those representing marine interests asking that a fog-signal be established at this point. The passage between the eastern side of Angel Island and Southampton Shoal is quite narrow. The strong tides setting in and out through the Golden Gate have full force on a vessel bound up or down the bay, and in the case of ships being towed, as so many are, past this point, the set of the current is enough to make it hazardous, there being danger either of running aground on Southampton Shoal or Angel Island. An enormous quantity of shipping annually passes this point, bound to or from the great grain wharves at Port Costa, the Sacramento and San Joaquin rivers, and Mare Island Strait. Hundreds of the largest sailing ships are towed from San Francisco to Port Costa, where they load with grain and are then towed down and out to sea. In this way there is more shipping passing through these waters than anywhere else in the district, except through the Golden Gate. There have been a number of casualties in the vicinity of this point.

Among many were the following:

The ferry steamer *Contra Costa*, plying between San Francisco and San Quentin with passengers, ran ashore near California City.

The ship *E. B. Sutton*, while being towed down from Port Costa, ran ashore near Quarry Point, Angel Island.

The ship *Eleanor Margaret*, bound to Port Costa, ran ashore on Bluff Point, Racoon Straits.

The ship *Maulsden*, while being towed to Port Costa, ran ashore on Southampton Shoal.

Mariners have asked that Quarry Point be selected for the fog-signal station, because, to make a start upriver in a fog, it is necessary to make Angel Island to get a departure. After careful examination the Board reached the conclusion that a fog-signal at this locality would be a decided aid to mariners. In view of the great economy of establishing and maintaining a large fog bell here instead of a steam fog-signal, it decided in favor of the former. It is estimated that it will cost \$6,000 to establish this fog bell, and it is recommended that an appropriation of this amount be made therefor.

Much complaint has been made by mariners that the bell fog-signals used at the light and fog-signal stations in this vicinity are not sufficiently far-reaching. The Board is now of opinion that the signal to be used at Quarry Point should be of a more efficient character than a bell, particularly as all the commerce bound to Vallejo, Mare Island, and the Sacramento and San Joaquin rivers must pass close to a bold and rocky promontory. It is believed that it should be a first-class compressed-air siren, similar in power to the fog-signal recently established at Point Arguello. Quarry Point being part of the military reservation at Fort McDowell on Angel Island, no expense for its site would be incurred. It is estimated that such a signal, with quarters for the keepers, could be built for \$12,000, and the board recommends that an appropriation of that amount be made therefor.

28. *Angel Island, San Francisco Bay, California.*—A fixed red lens-lantern light was established.

— *Southampton Shoal, San Francisco Bay, California.*—This shoal is thus described in the Pacific Coast Pilot:

This extensive shoal lies nearly in the middle of the San Francisco Bay, to the northwest of Angel Island, and is therefore a menace to the navigation of large vessels bound to Vallejo, Mare Island, Benicia, Port Costa, or Antioch. Within the 3-fathom line it is 2½ miles long, northwest and southeast nearly, with an extreme breadth of one-third of a mile.

During the last year the Santa Fe Railroad Company established a ferry from San Francisco to Point Richmond. The straight course between these two places runs close to the southeast point of this shoal.

The Board is of opinion that the interests of commerce and navigation demand the establishment of a fog bell and lens-lantern light on the southeast end of this shoal. It is proposed to build a frame dwelling for the keeper on iron piles, with gallery and bell house, the signal to be a 3,000-pound bell struck by a Stevens apparatus, the lens lantern to be exhibited from the corner of the gallery. It is estimated that the entire structure can be built for a sum not exceeding \$30,000, and the Board recommends that an appropriation of this amount be made therefor.

— *Karquines Strait, between San Pablo Bay and Suisun Bay, California.*—The immense commerce passing between San Francisco Bay and the Sacramento River region passes through Karquines Strait, both going and coming, and it has become evident that it is necessary, in the interests of commerce and navigation, to establish a light and fog-signal on a point opposite that now occupied by the Selby Smelting Works. It is estimated that this can be done for a sum not exceeding \$50,000, and the Board recommends that an appropriation of this amount be made therefor.

29. *Alcatraz Fog-Signal Station, San Francisco Bay, California.*—This new fog-signal station, established on the northern end of the island, consists of a small frame structure for housing the clockwork striking apparatus, with a 3,000-pound fog bell mounted in front. An

electric attachment was made for the machinery, which enables the keeper to start or stop the striking of the bell from his quarters.

30. *Alcatraz, on summit of Alcatraz Island, San Francisco Bay, California.*—The dwelling was reroofed; slight repairs were made to the illuminating apparatus and to the plumbing and the lantern gallery. In a joint report, dated May 13, 1901, the district officers recommended that the characteristic of this light be changed from fixed to a flashing white light, in order that it may be more readily distinguished from the electric lights surrounding it.

31. *Yerba Buena Island, San Francisco Bay, California.*—The bell machinery was removed and a new 10,000-blow apparatus was installed. The new signal has the same characteristic as the old one.

38. *Mare Island Strait Shoal Beacon, entrance to Mare Island Strait, San Pablo Bay, California.*—Originally this was an unlighted beacon, consisting of a 3-pile structure crossed with boards. It was cut down 6 feet and decked over with a triangular lamp house built on top, from the top of which a white post-lantern light was exhibited. The beacon was destroyed by a colliding craft and was rebuilt at the expense of the owners of the vessel doing the damage. On May 15, 1901, the intensity of the light was increased by changing it from a post-lantern to a lens-lantern light.

39. *Point Edith, Suisun Bay, California.*—A 4-pile beacon, surmounted by a lamp house, was built in the water off Point Edith, Suisun Bay, California. From the top of this structure a red lens-lantern light is shown. The light was established March 4, 1901.

47. *Point Reyes, Pacific Ocean, California.*—The old water shed was repaired. This, together with the new rain shed laid last year, gives about 18,000 square feet of catchment area, which in years of normal rainfall should give an ample water supply. A small fuel house was built near the dwellings. A system of six intercommunicating telephones was installed to replace the call bells formerly in use. Various repairs were made.

49. *Cape Mendocino, seacoast of California.*—The roadway was repaired. The act of June 6, 1900, appropriated \$1,000 for the construction of a masonry oil house at this station. A stone oil house was built. The temporary structure now occupied by one of the keepers is almost uninhabitable, on account of its bad and unsanitary condition; it is also unsafe, as its foundations are so poor that it has settled several times during the last year, and although each time it has been raised and temporarily repaired, it has subsequently settled. As it was originally built for an oil house and not a dwelling, no permanent improvement can be attempted.

The following recommendation, made in the Board's last five annual reports, is renewed:

The plans approved by the Board contemplated the construction of an additional cottage for the assistant keeper. It is estimated that a proper structure can be erected for \$5,500, and it is recommended that an appropriation of that amount be made therefor.

50. *Humboldt, on Table Bluff, entrance to Humboldt Bay, California.*—A set of new grate bars was sent to the station for the fog-signal boiler.

The act of March 3, 1901, appropriated \$1,408.44 for a telephone line from this station to Salmon Creek, California, there to connect with the general telephone system of the coast. This matter will be taken in hand as soon as possible.

— *Humboldt Bay, California.*—The following recommendation, made in the Board's last two annual reports, is renewed:

There are three lights maintained on the jetties to guide vessels in over the bar. These, however, are ineffective in thick or foggy weather by day or night. It is evident that a fog-signal is much needed here. It is estimated that a proper fog-signal can be established on either the north or south jetty at a cost not to exceed \$15,000. The Board therefore recommends that an appropriation of this amount be made therefor.

57. *Trinidad Head, Pacific Ocean, California.*—The roadway was cleared of drifted sand, a fence was built on the line of the reservation, and a sewer, which was washed out by the storm, was relaid. The wire cable for carrying the weights of the fog-bell machinery broke, and the weights, which were lost in the sea, were replaced. A 4,000-gallon water tank was set up at the barn. The lease of the wharf on the light-house reservation expires December 31, 1901. It has been decided to offer it for lease again to the highest bidder after due advertisement.

59. *St. George Reef, on Northwest Seal Rock, seacoast of California.*—The boom of the hoisting derrick is not long enough to reach beyond a dangerous eddy just off the rock, and this was the cause of a serious accident to one of the keepers when attempting to hoist the launch from the water. It is proposed to replace the 60-foot boom with one 90 feet long. This change in the derrick will require extra iron work, and that has been taken in hand. The boom and iron have been purchased and are now being fitted so as to be ready for transportation to the rock on the next trip of the light-house tender.

REPAIRS.

Repairs, more or less extensive, were made at the following-named stations:

- | | |
|--------------------------------------|-------------------------------------------|
| 1. Point Loma, Cal. | 37. Mare Island, Cal. |
| 10. Point Fermin, Cal. | 40. Roe Island, Suisun Bay, Cal. |
| 15. San Luis Obispo, Cal. | 41. Middle Point Beacon, Suisun Bay, Cal. |
| 16. Piedras Blancas, Cal. | 42. Stake Point Beacon, Suisun Bay, Cal. |
| 20. Año Nuevo Island, Cal. | 48. Point Arena, Cal. |
| 23. Farallon Island, Cal. | 58. Crescent City, Cal. |
| 32. Oakland Harbor, Cal. | |
| 33. Oakland Harbor South Jetty, Cal. | |
| 36. East Brother Island, Cal. | |

LIGHT-VESSELS.

24. *San Francisco light-vessel, No. 70, off San Francisco Bar, California.*—This self-propelling steam light-vessel, built in 1897-98, is of about 590 tons displacement, carries a steam fog-signal, and shows a fixed white light. In order to repair the main boiler the electric lights were discontinued from July 25 to 29, 1900, during which time fixed white oil lights were shown from each masthead and a bell was struck by hand during foggy weather. On September 30, 1900, the steam chime whistle was disabled, but the whistle was repaired and ready for service 6 days later. On November 5, 1900, this vessel was brought in, received repairs to her hull, boilers, and machinery, and was returned to her station December 10, 1900, 35 days later. As it was impracticable to employ the *Madroño* as a relief light-vessel, two attempts were made to charter a suitable vessel for this purpose. The

lowest bid received was \$75 per day, which was rejected. A gas buoy was moored to mark the station. Owing to the expense and labor of maintaining the electric lights on this vessel, oil lights were permanently substituted on March 4, 1901, and the characteristics of the lights were changed to fixed white without eclipses. The order of the lights was not changed, but the lens lanterns were suspended below instead of above the masthead galleries, thus reducing the height of the focal plane to 52 feet and their range of visibility to $12\frac{1}{2}$ miles. In order to provide against the necessity of bringing this vessel in during the foggy months, and at the same time to definitely fix the time of her absence, it was decided, for the benefit of commerce, that the vessel should be brought in each year in April, the season for least fog on this coast. In pursuance of this arrangement the vessel was again brought in on April 3, 1901, docked, cleaned, and repaired, and returned again to her station on May 2, 29 days later. It is not proposed to have her leave her station again until April, 1902. Arrangements were renewed with a schooner to stop at this vessel twice a month, on her way to and from the Farallon light-station for the transportation of men, mail, and supplies. During the past year this light-vessel consumed about 38 tons of coal to operate the fog signal alone, about 190 tons for the electric lights for the period from July 1, 1900, to March 4, 1901, when oil lights were permanently substituted, and 143 tons additional for all other purposes, making a sum total of about 371 tons used for all purposes.

Relief light-vessel for the Twelfth and Thirteenth light-house districts, Pacific coast.—By the act approved March 3, 1901, the sum of \$90,000 was appropriated for constructing, equipping, and outfitting, complete for service, a first-class steam light-vessel, with steam fog-signal, as a relief vessel for the Twelfth and Thirteenth districts. The plans for this vessel are being made in the office of the Light-House Board, and are about half finished. The vessel is described more fully in that part of this report which relates to the Thirteenth light-house district.

— *Blunts Reef light-vessel, Pacific Ocean, off Cape Mendocino, California.*—The following recommendation, made in the Board's last three annual reports, is renewed:

Officers of the Revenue-Cutter Service and of the Coast and Geodetic Survey in the spring of 1898 called the attention of the Board to the need of additional aids to navigation at this point. Cape Mendocino forms a projecting angle into the Pacific Ocean, and is the turning point for vessels bound up or down the coast, and it is important that vessels bound up or down the coast should be able at all times to know when this point is reached. The light shown at Cape Mendocino is sufficient on clear nights, but in thick weather it is of little if any use, and the light-station here is without a fog-signal. Blunts Reef is dreaded by coasting sailors, as will be evident from the following extract from the Pacific Coast Pilot:

"For many years the passage between the reef and the cape was generally used by coasting steamers and lumber vessels, but the examinations of 1870 and 1872 have shown the passage to be a very dangerous locality, and the insurance companies will not underwrite vessels using it."

The chart of the vicinity shows that Blunts Reef is nearly 3 miles from the cape. The Board is of opinion that a first-class light-vessel, with steam power, steam fog-signal * * * should be placed off Blunts Reef. It is estimated that such a vessel can be built for \$90,000, and it is recommended that an appropriation of this amount be made therefor.

— *Wreck of May Flint light-vessel, San Francisco Bay, California.*—On the evening of September 8, 1900, the American iron ship *May Flint*, from Seattle, with 5,000 tons of coal, entering the harbor

under sail, without tug or pilot, fouled the ram of U. S. S. *Ionca*, thence drifted into the bark *Vidette*, capsized and sunk in 10 fathoms of water, about 800 yards off the Pacific Mail dock. As the vessel was a serious menace to navigation, the sailboat from Yerba Buena depot was moored over the spot during September 9 and 10, displaying at night a fixed red light from the gaff. The temporary light-vessel was removed on September 11, when the wreck was marked by buoys.

DAY OR UNLIGHTED BEACONS.

San Diego Bay, California.—The old beacon No. 8, San Diego, Cal., was destroyed and will be replaced with a 3-pile beacon. Beacons Nos. 3, 4, and 5, single-pile red beacon, single-pile black beacon above No. 5, and beacon No. 7, are in bad condition, and a contract was made for replacing them with the standard 3-pile beacons.

Berkeley Reef, San Francisco Bay, California.—The single-pile beacon, crossed with boards, painted red and black horizontal stripes, was destroyed on February 11, 1901. It was rebuilt on March 9, 1901, in practically the same location.

Alviso Channel, San Francisco Bay, California.—A 3-pile beacon, crossed by slats, painted red and marked with figure 10 in white. This beacon, destroyed on December 10, 1900, was rebuilt on March 25, 1901, slightly to the northward of the old position, and is now on the point of the shoal.

Petaluma Inlet, San Pablo Bay, California.—A 3-pile beacon, No. 5, crowned with a box, painted black, and marked with figure 5 in white, is in bad condition and will soon need to be rebuilt.

Simmons Point Beacon, Suisun Bay, California.—A single-pile beacon, crossed with boards and whitewashed. On May 25, 1901, this beacon was found broken off 8 feet above the water. It will be rebuilt as soon as practicable.

FOG-SIGNALS OPERATED BY STEAM OR OIL ENGINES.

13. *Point Conception, California.*—This 12-inch steam whistle, in duplicate, was in operation some 175 hours, and consumed about 8 tons of coal and 19 cords of wood.

14. *Point Arguello, California.*—This first-class siren, in duplicate, operated by 13-horsepower oil engines and compressed air, was in operation about 84 hours since the date of its establishment, June 1, 1901, and consumed some 171 gallons of oil.

15. *San Luis Obispo, California.*—This 10-inch steam whistle, in duplicate, was in operation some 858 hours, and consumed about 64 tons of coal.

17. *Point Sur, California.*—This 12-inch steam whistle, in duplicate, was in operation some 810 hours, and consumed about 95 cords of wood.

20. *Año Nuevo Island, California.*—This 12-inch steam whistle, in duplicate, was in operation some 672 hours, and consumed about 39 tons of coal.

21. *Pigeon Point, California.*—This signal consisting of one 10-inch and one 12-inch steam whistle, was in operation some 641 hours, and consumed about 56 cords of wood.

22. *Point Montara, California*.—This 12-inch steam whistle, in duplicate, was in operation some 1,128 hours, and consumed about 11 tons of coal and 84 cords of wood.

23. *Farallon, California*.—This first-class steam siren, in duplicate, was in operation some 844 hours, and consumed about 53 tons of coal.

24. *San Francisco light-vessel, No. 70, California*.—This 12-inch steam chime whistle, in duplicate, was in operation some 553 hours, and consumed about 38 tons of coal.

25. *Bonita Point, California*.—This first-class steam siren, in duplicate, was in operation some 1,055 hours, and consumed about 109 tons of coal.

27. *Lime Point, California*.—This 12-inch steam whistle, in duplicate, was in operation some 587 hours, and consumed about 73 tons of coal.

31. *Yerba Buena, California*.—This 10-inch steam whistle, in duplicate, was in operation some 142 hours, and consumed about 20 tons of coal.

36. *East Brother Island, California*.—This 12-inch steam whistle was in operation some 252 hours, and consumed about 40 tons of coal.

47. *Point Reyes, California*.—This 12-inch steam whistle, in duplicate, was in operation some 1,080 hours, and consumed about 84 tons of coal.

48. *Point Arena, California*.—This signal, consisting of one 10-inch and one 12-inch steam whistle, was in operation some 1,062 hours, and consumed about 109 cords of wood.

50. *Humboldt, California*.—This signal, consisting of one 10-inch and one 12-inch steam whistle, was in operation some 440 hours, and consumed about 44 cords of wood.

59. *St. George Reef, California*.—This 12-inch steam whistle, in duplicate, was in operation some 539 hours, and consumed about 31 tons of coal.

BUOYAGE.

The Presidio Shoal buoy, San Francisco Bay, which was set adrift by a passing steamer and replaced temporarily by a second-class buoy on July 2, 1900, was replaced again by a first-class buoy on November 17, 1900.

Arena Cove bell buoy went adrift July 3, 1900, and grounded about a mile and a half south of its station, well inshore. It was removed and a new buoy placed thereon October 17, 1900. This buoy was found disabled on June 17, 1901, and was repaired the next day.

The wreck of the ship *May Flint*, in San Francisco Bay, was marked on September 11, 1900, by two red and black horizontal-striped buoys—a first-class can about 300 feet northwest of the wreck, and a second-class nun about 300 feet southeast of it. On October 12, 1900, the can buoy was dragged 200 feet out of position, and on October 26 it was replaced.

A first-class red nun buoy, numbered 2, was established on October 13 in 22 feet of water, about 350 feet off the outer end of South Jetty, Humboldt Bay, to mark the submerged end of the jetty.

The black first-class spar buoy off Cayucos Landing, Estero Bay, went adrift on November 6, 1900, and was replaced on February 9, 1901.

On November 19, 1900, the Noonday Rock bell buoy was reported not sounding. It was placed in good working order on December 4, 1900.

The *May Flint* wreck (SE.), a second-class nun buoy, was replaced on November 17, 1900, by a small whistling buoy.

On November 11, 1900, the Lower Junction buoy, Suisun Bay, was changed from a first-class to a second-class spar buoy.

On December 21, 1900, the mammoth nun buoy off Fort Point Ledge, San Francisco entrance, parted its moorings and went adrift. After several attempts the tug *Vigilant* succeeded in towing it to the light-house depot wharf. It was replaced on December 27, 1900.

On December 10, 1900, the steamer *A. C. Freese* ran into and destroyed beacon No. 10, Alviso Channel, San Francisco Bay. It was rebuilt on March 25, 1901, slightly to the northward, and is now on the point of the shoal.

On December 13, 1900, the iron spar buoy off outer end of North Jetty, Humboldt Bay entrance, parted its moorings and went on the beach half a mile north of the Old Tower.

On December 17, 1900, the old iron spar buoy, formerly marking the outer end of South Jetty, went adrift and onto the beach, and broke in two. It was replaced on April 17, 1901.

Fauntleroy Rock bell buoy, Crescent City entrance, was reported on December 19, 1900, as dragged 300 feet inshore from its proper position. A new bell buoy was placed on April 11, 1901. Several attempts have been made, without success, to recover the old buoy.

Beacon No. 8, San Diego Bay, disappeared on January 10, 1901. It is now being rebuilt.

Saunders Reef whistling buoy, about $7\frac{1}{2}$ miles to the southward of Point Arena, which went adrift in January, 1901, was replaced by a new buoy on January 8, 1901.

On December 18, 1900, the Fort Bragg Landing whistling buoy went adrift and onto the beach near Shelter Cove. Before the tender could visit the locality another severe storm so damaged the buoy that it was not worth removing. A new buoy was established off Fort Bragg on January 8, 1901.

Cayucos Landing buoy, No. 2, went adrift and onto the beach on February 19, 1901. It was replaced by a new buoy on March 6, 1901.

On February 11, 1901, the Berkeley Reef beacon disappeared. It was rebuilt on March 9, 1901.

Pinole Point Shoal buoy, a first-class nun, placed as a temporary aid to mark the best water over Pinole Point Shoal, San Pablo Bay, was dragged out of position on January 3, 1901, and permanently discontinued on February 11, 1901.

On March 11, 1901, Point Buchon whistling buoy parted its moorings and went onto the beach halfway between Morro and Cayucos. This information was telegraphed the tender *Mudroño* at San Diego, and while on her way north she placed a new buoy off this point on March 20, 1901. An attempt will be made to recover the old buoy from off the beach.

Point Delgada bell buoy was disabled on April 16, 1901. The ballast ball became detached and the buoy capsized. It was put in working order on May 28, 1901.

The mammoth nun buoy marking Fort Point Ledge, San Francisco entrance, was dragged off the ledge on May 18, 1901, by the strong

tides, and with its 11,000-pound sinker and all its moorings intact anchored itself in the vicinity of Mile Rock. It was replaced the same day. On June 15, 1901, this buoy again dragged its moorings to Mile Rock. It was replaced on June 20, 1901, slightly nearer the ledge, with the hope that it will not again move.

Simmons Point beacon, Suisun Bay, was found on May 25, 1901, broken off 8 feet above the water. It will be rebuilt.

The Piedras Blancas whistling buoy was found on June 8, 1901, disabled so that the whistle was not sounding. It was repaired on June 18, 1901.

On May 27, 1901, Noonday Rock bell buoy was reported disabled. Several attempts were made to replace it, but without success, owing to the strong winds and rough sea.

LIGHT-HOUSE DEPOT.

Yerba Buena Island.—The tank on the hill was raised and a timber and masonry foundation was built under it. A derrick capable of handling 7 tons was built on the wharf. It is furnished with a hand power and is also connected by leads to a steam winch. The winch was fitted with gypsy ends and set up in a position where it can be used to haul boats out on the ways and also to handle the derrick and buoys on the wharf.

The following recommendation, made in the Board's last annual report, is renewed:

Large supplies of mineral oil are at times held at this depot waiting distribution. This has been deemed hazardous to the depot buildings and to the supplies stored in them; hence it is proposed to build an oil house in a position entirely removed from the other buildings. Such a position is found to the northward of the wharf, on a rocky bench at nearly the same level as the deck of the wharf. The site can be prepared at small cost, and a structure of brick with an iron roof can be built at an estimated cost of \$8,000. The Board recommends that an appropriation of this amount be made therefor.

LIGHT-HOUSE TENDERS.

Madroño.—This iron screw steamer was built in 1885, and is of about 412 tons gross burden. She was undergoing extensive repairs until September 1, 1900, and after that date was employed in attending to the buoyage, supply, and inspection of the district. She changed, placed, or replaced 82 buoys; painted or repaired 2 beacons; landed some 747 tons of coal at 22 stations; delivered supplies at 41 stations, and visited 82 stations for inspection. In doing this she steamed about 8,714 miles upon a consumption of some 853 tons of bituminous coal. The crew was employed at the light-house depot 577 hours and the vessel was laid up 88 days for repairs. The repairs under way at Mare Island Navy-Yard in connection with the installation of the new boilers were completed on September 1, 1900. In addition to the above the following-named repairs were made: A new set of air-pump valves and a fusible plug in the top of the combustion chamber were supplied; a key was made and fitted for the low-pressure eccentric; the copper steam-whistle pipe was extended so as to be 6 feet above the pilot house, and a new Blake pump and steam steering gear were installed. The ship's boats and rigging are in good condition. A surfboat and a 21-foot alco-vapor launch were furnished. The *Madroño* was docked in January, 1901, at San Francisco and her bottom painted.

Madroño's steam launch.—This launch, which is used for communicating with the depot at Yerba Buena Island and for distributing supplies to harbor stations, etc., is in good condition. New tubes were put in the boiler, the air pump was rebored, and a bucket cover and rings were put in. During the year this launch ran about 2,308 miles on a consumption of some 22 tons of coal.

Hazel.—This small wooden screw launch is of about 7 tons gross burden and was used in attending construction parties at the bay stations. In August, 1900, and again in April, 1901, she was taken from the water and scraped and painted and her machinery was put in good order. She ran about 1,260 miles on a consumption of some 13 tons of coal.

Tender for the engineer of the Twelfth light-house district.—The following recommendation was made in the Board's annual reports for 1888 and 1889:

There is now no tender for the engineer service of this important district. The only tender that can go to sea is almost constantly employed by the inspector in supplying and inspecting the light stations and in caring for its buoys. The steam launch can be used only in the sheltered waters of San Francisco Bay. An additional tender is much needed capable of attending to construction and repair work at the several exposed stations in this district, which extends along the Pacific coast from the boundary between California and Mexico to the boundary between California and Oregon. It is estimated that a proper tender for this duty can be built for not exceeding \$90,000, and it is recommended that an appropriation of this amount be made therefor.

The following recommendation was made in the Board's annual report for 1900 and is renewed:

When the estimate for this vessel was made it could have been built for the sum named. It can not now be built for less than \$125,000, and the Board recommends that an appropriation of this amount be made therefor.

THIRTEENTH DISTRICT.

This district extends from the boundary between California and Oregon to the northern boundary of the United States and includes Alaska. It embraces all aids to navigation on the seacoast of Oregon and Washington, on the United States waters of the Strait of Juan de Fuca, Washington Sound, and the Gulf of Georgia, and on the tidal waters tributary to the sea, strait, sound, and gulf between the limits named, together with those on Alaskan waters.

Inspector.—Commander William P. Day, United States Navy.

Engineer.—Capt. William C. Langfitt, Corps of Engineers, United States Army.

There are in this district—

Light-houses and beacon lights, including 100 post lights.....	143
Light-vessel in position.....	1
Day or unlighted beacons.....	46
Fog-signals operated by steam, caloric, or oil engines.....	15
Fog-signals operated by clockwork.....	4
Whistling buoys in position.....	8
Bell buoys in position.....	6
Other buoys in position.....	291
Steamer <i>Manzanita</i> , buoy tender and for supply and inspection.....	1
Steamer <i>Columbine</i> , for construction and repairs.....	1

LIGHT-STATIONS.

60. *Cape Blanco, Oregon.*—The following recommendation, made in the Board's last four annual reports, is renewed:

The quarters are insufficient for the three keepers. They can not be added to or altered to meet the needs of the station. It is estimated that a suitable new building can be erected for not exceeding \$4,500, and it is recommended that an appropriation of that amount be made therefor.

61. *Coquille River, Oregon.*—It is proposed to construct a new oil-house on a concrete foundation in the rear of the fog-signal building, the foundation to be of sufficient height to prevent a recurrence of damage from tides or storms. There is no boathouse at the station, and the boat, which is in daily use, is hauled up on the beach near the station and left exposed to the weather. It is proposed to construct a boathouse on piling at a convenient point on the front of the reservation and equip the same with hoisting gear and tackle. The dwelling and barn are built on a bleak sand spit, and immense quantities of sand are frequently piled up around them, rendering access to the different buildings difficult and at times almost impossible. It is proposed to replace the present decayed bulkhead and plank the area around the buildings to prevent the drifting of the sand to a large extent, and to further control the drifting of the sand it is proposed to construct sand fences in portable sections, which can be raised or shifted in position as experience shows desirable. Other repairs are also necessary. The work is to be done by hired labor and purchase of material in open market. The necessary material has been pur-

chased and will soon be delivered at the station, when the work will be started.

69-73. Coos Bay lights, Oregon.—On March 27, 1901, the following-named range lights were established to mark the dredged channel in the westerly side of the easterly part of Coos Bay:

Stave Mill lower range lights: The front light is the existing Stave Mill light changed from fixed red to fixed white; the rear light is a fixed red post-lantern light, 25 feet above the water, suspended from a white arm on a white post on the westerly shore of Coos Bay, on the southerly prolongation of the axis of the dredged channel through Stave Mill shoal and 800 feet ($\frac{1}{8}$ mile) S. $\frac{3}{4}$ E. in the rear of the front light.

Stave Mill upper range lights.—The front light is the existing Stave Mill light changed as before stated; the rear light is a fixed red post-lantern light, 25 feet above the water, suspended from a white arm on a white post, on the westerly shore of Coos Bay, on the northerly prolongation of the axis of the dredged channel through Webster Point shoal and 600 feet ($\frac{1}{10}$ mile) N. W. by W. $\frac{1}{4}$ W. in rear of the front light.

Marshfield range lights.—The front light is a fixed white post-lantern light, 8 feet above the water, suspended from a white arm and support on the center pile of a five-pile dolphin, standing in about $\frac{1}{2}$ feet of water on the middle ground between the Coos Bay and river channels, and on the northerly prolongation of the axis of the dredged channel through Hogsback Shoal. The rear light is a fixed white post-lantern light, 12 feet above the water, suspended from a white arm on the highest pile of a three-pile dolphin, standing in about 1 foot of water on the northerly side of the Marshfield Channel to Coos River on the northerly prolongation of the axis of the dredged channel through Hogsback Shoal, and 900 feet (about $\frac{1}{4}$ mile) N. $\frac{1}{4}$ W. in rear of the front light. The bearings are magnetic; the miles are nautical; the heights referred to mean high water; the depths to low water.

81. Yuquina Head, Oregon.—The following recommendation made in the Board's last two annual reports is renewed:

The quarters furnished the three keepers are insufficient for their needs. These quarters can not be added to or altered to meet the needs of the station. A new building is required. It is estimated that a suitable one can be erected for not exceeding \$4,000, and the Board recommends that an appropriation of that amount be made therefor.

83. Tillamook Rock, Oregon.—On December 15 and 16, 1900, the station was visited by a heavy southwest gale. At times the seas completely covered the lantern, which was repeatedly struck with small pieces of rock and bunches of barnacles. The damage caused by the storm was immediately repaired, and other repairs were made.

87. Desdemona Sands, Oregon.—The act approved June 6, 1900, appropriated \$24,000 for establishing a light and fog-signal station near the lower end of the Middle Ground, Desdemona Sands, mouth of the Columbia River, Oregon, in addition to \$11,000 appropriated by the act approved on June 11, 1896, for Fort Stevens light and fog-signal station, which by act approved on June 6, 1900, was made available for this light and fog-signal. A sketch and estimate of the proposed building were made, and detailed plans and specifications are now under preparation.

149. *Cape Disappointment, Washington.*—Some 240 feet of cement walk was laid around the dwelling, and the area at the back entrances of the dwelling was cemented. The plank walk from the dwelling to the tower was renewed for some 1,500 feet. Extensive repairs were made to the buildings and grounds.

152. *Grays Harbor, Washington.*—On April 19, 1899, the contractor for the erection of the station filed suit against the United States in the United States circuit court for compensation for additional labor, etc., in constructing the buildings. This case was tried June 27, 1900, and on March 29, 1901, judgment was rendered in favor of the plaintiff for \$4,599.92.

162. *Slip Point, Washington.*—The act approved June 6, 1900, appropriated \$12,500 to establish a light-house and fog-signal at Slip Point, Clallam Bay, Washington. A preliminary survey was made to determine the area and boundaries of the site. The price asked for the land needed for the station is excessive. The matter is now in the hands of the United States attorney for the initiation of proceedings for condemnation of the land.

164. *New Dungeness, Washington.*—The following recommendation was made in the Board's annual reports from 1895 to 1899:

The dwellings erected at this station are arranged for the accommodation of two families and one single man; but as there are four keepers employed, and sometimes three of them with families, there is insufficient accommodation, and a new dwelling is urgently needed. The estimated cost of a suitable building, cistern, outhouse, etc., for this station is \$4,000.

The following recommendation was made in the Board's annual report for 1900, and is renewed:

It is now estimated that \$4,500 will be required for the construction of this dwelling, and it is recommended that an appropriation of that amount be made therefor.

167. *Admiralty Head, Washington.*—Owing to the fortification works at this place it was found necessary to move this station. Exchange was made of the present light-house reservation for two suitable pieces of ground nearby under the charge of the War Department. Bids were opened by the War Department for constructing the new buildings, but as the lowest bid was largely in excess of the appropriation none could be accepted. The act approved on March 3, 1901, appropriated \$12,000, to be expended in part payment of the cost of the buildings. The Secretary of the Treasury has been requested to take the necessary action to place this expenditure under the direction of the Secretary of War.

172. *Point No Point, Washington.*—Two redwood 1,000-gallon water tanks were built to supply the fog-signal apparatus. Minor repairs were made.

174. *West Point, Washington.*—The fog-signal apparatus, consisting of a Daboll trumpet operated by hot-air engines and air compressors, in duplicate, is worn out. The fog-signal building is a frame structure located in the rear of the tower, and in a dilapidated condition and almost beyond repair. Bids were asked for furnishing two 1½ horsepower oil engines, each with a direct connected compressor on the same base, and for constructing a brick or concrete building in front of the tower. The one bid received was rejected March 25, 1901, as it was largely in excess of the estimate for doing the work. The work therefore will be done by hired labor. The material was purchased in open

market under existing regulations, and will soon be delivered at the station, when the work will be commenced.

175. Buttery Point, Washington.—The following recommendation, made in the Board's last six annual reports, is renewed:

The establishment of a fog-signal at this point is strongly urged. It is estimated that a fog bell, with suitable dwelling, grounds, etc., could be erected for \$6,000, and it is recommended that an appropriation of this amount be made therefor.

177. Robinson Point, Washington.—The following recommendation was made in the Board's annual reports for 1897-98 and 1899:

Now that there is a fog-signal here, an additional keeper is much needed. But the keeper's dwelling is barely sufficient for the present keeper and his family. An additional keeper's dwelling is therefore an urgent necessity. It is estimated that a suitable building can be erected for not exceeding \$3,000, and it is recommended that an appropriation of that amount be made therefor.

The following recommendation was made in the Board's annual report for 1900, and is renewed:

It is now estimated that \$4,000 will be required for the construction of this dwelling, and it is recommended that an appropriation of that amount be made therefor.

178. Browns Point, Washington.—The act approved June 6, 1900, appropriated \$6,000 to establish a light and fog-signal at Browns Point, on Commencement Bay in Puget Sound entrance to harbor of Tacoma. A preliminary survey was made to determine the area and boundaries of the site. As the price asked for the proposed site was excessive, proceedings for the condemnation were commenced.

— *Burrows Island, Rosario Strait, Washington.*—The following recommendation, made in the Board's last four annual reports, is renewed:

There is much traffic through Rosario Strait, which will naturally increase in the future. During certain seasons of the year fog and smoke from forest fires prevail. Burrows Island is a point of departure for most of the vessels plying the strait. The tides and currents here are strong and variable, and there are several dangerous reefs in the immediate vicinity. A light and fog-signal at the southwest point of Burrows Island would be of great use to commerce and navigation. It is estimated that they could be established for not exceeding \$15,000, and it is recommended that an appropriation of this amount be made therefor.

205. Semiahmoo Harbor, Semiahmoo Bay, Gulf of Georgia, Puget Sound, Washington.—The following recommendation, made in the Board's last four annual reports, is renewed:

There is now a post light at Semiahmoo. While it is useful, it is insufficient for the needs of commerce. Blaine, the principal town in these waters, has a population of some 1,500, and certain lumber interests. At Semiahmoo, on the opposite side of the bay, which is narrow, there is a large cannery. Several lines of steamers from Vancouver on the north and Tacoma on the south touch at Blaine. During the fishing season this commerce is increased by vessels running in connection with the cannery. The harbor is difficult to enter, particularly at night. A small light and fog-signal would be of much service to commerce. It is estimated that they could be established for not exceeding \$25,000, and it is recommended that an appropriation of this amount be made therefor.

ALASKAN LIGHT-HOUSES.

The act approved June 6, 1900, appropriated \$100,000 to establish light-houses and fog-signals in Alaskan waters, and by act approved March 3, 1901, \$200,000 more was appropriated for this purpose. The inspector and engineer of this light-house district started on June 23,

1900, for Alaska to inspect the proposed light-house sites, and they returned on August 18, 1900. On October 13, 1900, they submitted a joint report making recommendations as to light and fog-signal stations. The following is a summary of the report, the stations being arranged in order of their importance to navigation:

Station recommended.	Equipment.	Fog-signal.	Estimated cost.
<i>Southeastern Alaska.</i>			
Southeast Five Finger Island	Light visible 15 miles	Trumpet	\$32, 900
Sentinel Island	do	do	31, 500
Lincoln Rock	do	do	45, 000
Mary Island	do	do	32, 400
Tree Point	do	Whistle	36, 213
Guard Island	Light visible 12 miles	Trumpet	30, 500
Point Retreat	Lens lantern	do	7, 400
Fairway Island, Peril Strait	do	do	8, 400
Eldred Rock	Light visible 15 miles	Trumpet	27, 300
Midway Island	do	do	30, 000
Point Sherman	Lens lantern	do	7, 400
<i>Western Alaska.</i>			289, 013
East of Scotch Cap	Light visible 15 miles	Steam whistle	40, 800
West of Scotch Cap	do	do	40, 800
Cape Saritchev	do	do	45, 900
Ulakhta Head	do	Compressed-air whistle	90, 000
			217, 500

On November 17, 1900, the inspector and engineer of the Thirteenth light-house district submitted a project for the expenditure of the \$100,000 appropriated by the act of June 6, 1900, in which the following-named stations were recommended:

Station recommended.	Equipment.	Fog-signal.	Estimated cost.
Southeast Five Finger Island	Light visible 15 miles	Trumpet	\$32, 900
Sentinel Island	do	do	31, 500
Point Retreat	Lens lantern	do	7, 400
Fairway Island, Peril Strait	do	Trumpet	8, 400

The Light-House Board, in December, 1900, directed that detailed plans and specifications be made for the work proposed at Southeast Five Finger Island and Sentinel Island. This was done, and on June 6, 1901, bids were opened for the erection of the stations. The lowest bid for the erection of Southeast Five Finger Island light and fog-signal station, \$22,500, was accepted and contract therefor was made. The lowest bid for the erection of Sentinel Island light and fog-signal station, \$21,267, was accepted and contract therefor was also made. In March, 1901, the Board decided that the work of establishing light and fog-signal stations in Alaskan waters should be continued according to the following estimates, so far as the appropriation admits, in the following order:

Southeast Five Finger Island, southeastern Alaska	\$32, 900
Sentinel Island, southeastern Alaska	31, 500
East of Scotch Cap, western Alaska	40, 800
Lincoln Rock, southeastern Alaska	45, 000
Mary Island, southeastern Alaska	32, 400
Cape Saritchev, western Alaska	45, 900
Tree Point, southeastern Alaska	36, 213
Ulakhta Head, western Alaska	90, 000
Guard Island, southeastern Alaska	30, 500
West of Scotch Cap, western Alaska	40, 800
Total	426, 013

It was also decided that detailed plans and specifications for the establishment of as many of these light and fog-signal stations as can be provided for under the appropriation already made be prepared. Plans and specifications for the stations to be established at east of Scotch Cap and the station at Lincoln Rock are well under way.

The Board, in the preface to its last annual report, made the following statement:

With regard to the aids to navigation proposed, the Board has carefully considered the various petitions and memorials, and has made such examination of proposed sites as was found practicable during the past season. As a result, eleven stations have been selected and an approximate estimate of cost prepared, which is the basis of the recommendation now made that \$300,000 be appropriated for the establishment of aids to navigation in Alaskan waters, which appear to be imperatively demanded by the interests of navigation. The localities selected are: Eldred Rock, Ralston Island, Point Retreat, Point Gardner, Cape Ommaney, Point Stanhope, Fairway Island, Guard Island, Mary Island, Cape Fox, and Cape Fanshaw.

The Treasury Department, in its letter of December 18, 1899, to the chairman of the Senate Committee on Commerce, in reply to his letter of December 11, 1899, asking the views of the Department relative to a bill making an appropriation for aids to navigation in Alaskan waters, stated:

Since the Board's annual report and estimates containing the above-named recommendation went to press the Board has received information from which it appears that this amount will be entirely insufficient. The Board is now of the opinion that the amount named in the bill—\$500,000—can be judiciously expended in the establishment of light-houses and fog-signals in Alaskan waters.

By act of June 6, 1900, an appropriation of \$100,000 was made to establish * * * light-houses and fog-signals in Alaskan waters. That amount being found insufficient, the Board now recommends the appropriation of \$400,000 more for this purpose.

By the act of March 3, 1901, \$300,000 was appropriated. The amount estimates as needed to establish the before-named ten light and fog-signal stations is \$426,013. Of that amount \$300,000 has already been appropriated. The amount of \$126,013 is still needed, and the Board recommends that an appropriation of that amount be made therefor.

REPAIRS.

Repairs, more or less extensive, were made at the following-named stations:

- | | |
|-------------------------------|--------------------------------|
| 60. Cape Blanco, Oreg. | 151. Willapa Bay, Wash. |
| 62. Cape Arago, Oreg. | 158. Destruction Island, Wash. |
| 74. Umpqua River, Oreg. | 160. Cape Flattery, Wash. |
| 81. Yaquina Head, Oreg. | 164. New Dungeness, Wash. |
| 82. Cape Meares, Oreg. | 166. Point Wilson, Wash. |
| 129. Warrior Rock, Oreg. | 177. Robinson Point, Wash. |
| 136. Williamette River, Oreg. | 203. Turn Point, Wash. |
| 150. North Head, Wash. | |

POST LIGHTS.

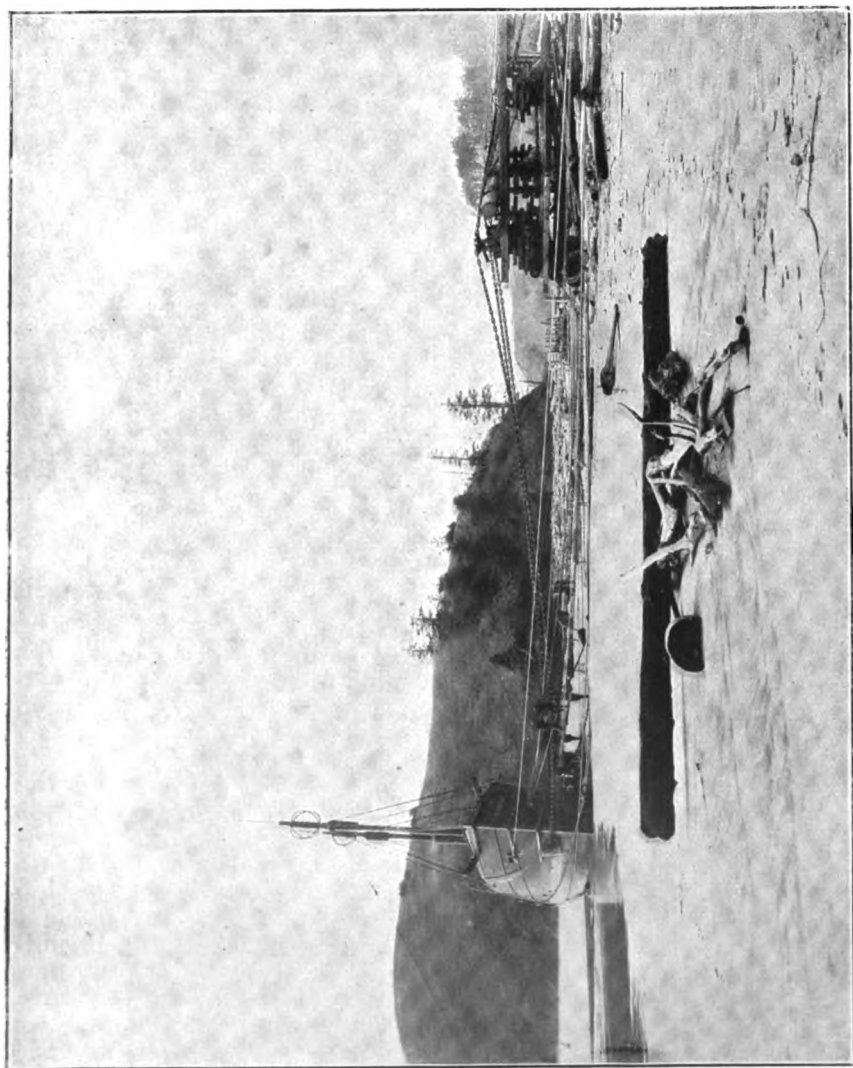
These lights are efficient aids to navigation in the inland waters of Oregon, Washington, and Alaska. With the exception of the lights near La Conner, and those in the Skagit River, Washington, which are inaccessible to the tender, all of these lights were inspected, and where necessary the structures were renovated. The keepers have generally done their work in a satisfactory manner. One post light was discontinued.

LIGHT-VESSELS.

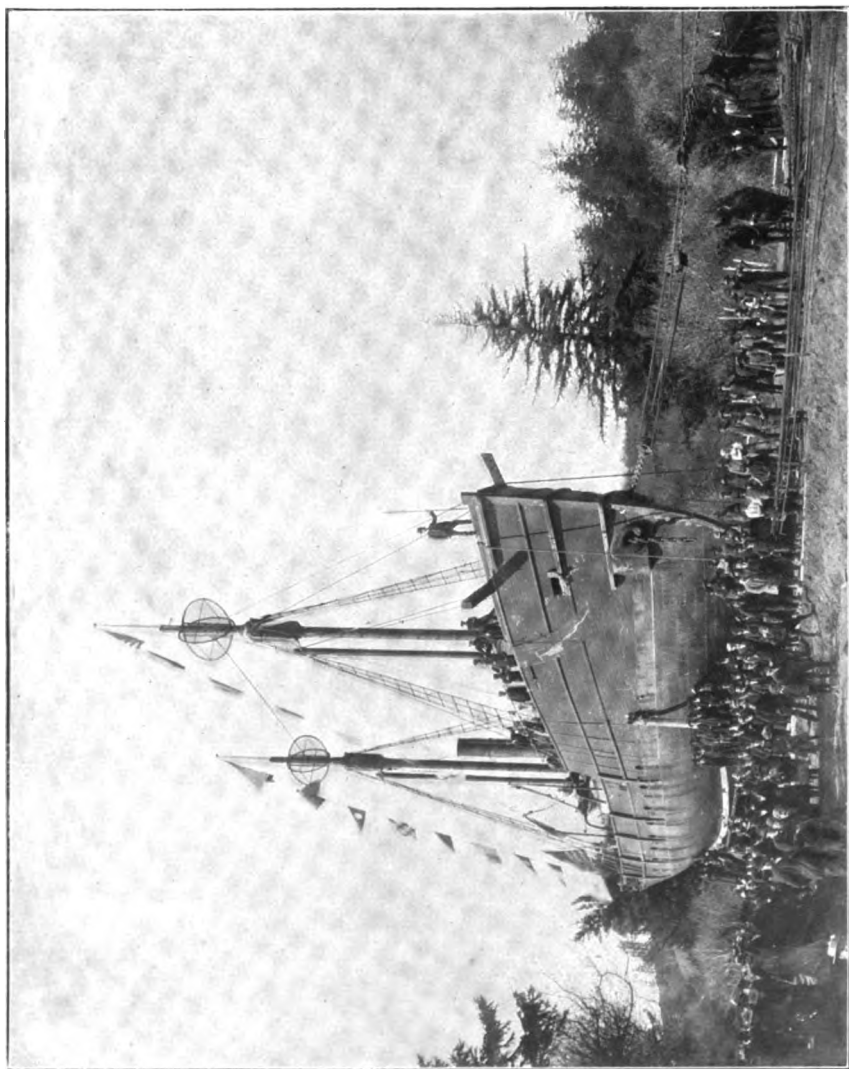
84. *Columbia River light-vessel, No. 50, Oregon.*—This vessel is moored off the entrance to Columbia River $7\frac{1}{4}$ miles S. S. W. $\frac{1}{2}$ W. from Cape Disappointment, Washington, light-house. On November 28, 1899, a 74-mile gale was blowing off the mouth of the Columbia River, raising a tremendous sea, with frightful breakers on the bar. Late in the afternoon of that day the heavy 2-inch chain of the light-vessel snapped about 45 fathoms from the hawse pipe, and the light-vessel was left at the mercy of wind and sea. The broken chain was promptly hove in, sail was set, and she stood offshore for about 25 miles until the next morning, when the storm somewhat abated. Changing her course, she then headed for the mouth of the Columbia River, although the breakers were running dangerously high on the bar. The condition of the vessel was by that time known on the shores of Washington and Oregon and at the light-house inspector's office in Portland, and steps had been taken to assist her into Astoria. The tug *Wallula* steamed out and got a hawser to the light-vessel, but it parted. The light-house tender *Manzanita* had in the meantime steamed out, and she got another hawser to the light-vessel. This line also parted, and in doing so it fouled the *Manzanita's* propeller, thus making perilous the position of both the tender and the light-vessel.

While the *Manzanita* was freeing herself from this broken line, the tug *Escort* took another hawser to the light-vessel and had succeeded in towing her nearly over the bar, when this third hawser parted and the light-vessel was adrift for the fourth time, and she was now in the breakers off McKenzie Head, in extreme peril, with night coming on. In order to save the crew and, if possible, the vessel, extreme measures were necessary, and it was decided to beach the vessel. To the north of McKenzie Head was a rock-bound coast lashed high by the angry seas. A short distance below was Fort Canby and the forbidding rocks of the southern end of Cape Disappointment. Between these two promontories lies a sand beach. To put the ship on this sand beach meant the probable saving of men and ship, while to strike the rocks on either side meant death to the crew and destruction to the vessel. She was headed for the friendly beach and struck it at 6.30 p. m. on November 29. By the proper use of the sails, the vessel was swung around so as to put her head seaward, when the vessel's high forecastle deck prevented the waves from rolling over her. The ship now being in a position of comparative safety, the men were brought on shore in the breeches buoy by the crew from the Cape Disappointment life-saving station, assisted by a detachment of soldiers from Battery M, Third United States Artillery, who were assisted with teams, and by citizens living near Fort Stevens. The exhausted sailors, as they were landed from the vessel, were immediately cared for at the army post hospital. Much credit is due to all participating in the rescue. The work of saving the movable property on the vessel was commenced as soon as possible, and it was continued to an end whenever sea and weather permitted.

Meantime the Light-House Board took the proper measures to save the ship. Specifications for floating the vessel were prepared and bids for doing the work were called for by advertisement. In due time a contract was made, but the contractor failed in his attempt to get the ship off the beach. New contracts were made one after another with



COLUMBIA RIVER LIGHT VESSEL. NO. 50. ASHORE NEAR MCKENZIE HEAD, WASHINGTON.



COLUMBIA RIVER LIGHT VESSEL, NO. 50, MOVING OVERLAND TO BAKER BAY, WASHINGTON.

other parties, and several unsuccessful attempts were made to launch her seaward from her position where she was somewhat sunk in the sand. The difficulties experienced caused a series of disappointments attended by losses of hawsers, anchors, and other gear. Finally the method was changed and a contract was made for hauling the vessel over the land to Bakers Bay and launching her in these inside waters and for delivering her at the Tongue Point, Oregon, light-house depot, all of which was done successfully.

Heavy seas, the suction of the sand, high tides, and other natural obstructions delayed the work and made it quite difficult. On April 9, 1901, the light-house inspector telegraphed to the Light-House Board "Light-vessel in cradle and started across land for Bakers Bay." The vessel meantime had been lifted out of the sand and turned around so that she headed landward. Then being accessible for inspection, she was thoroughly examined and arrangements were made to have her repaired. On April 23 the light-house inspector reported that the vessel was at Bakers Bay, ready for the repairs which must be made that she might be seaworthy before she was again launched.

The following is a summary of the action taken, in its chronological order:

An agreement was made on July 16, 1900, with a shipbuilding firm, for \$14,000, to float the vessel and deliver her in 60 days at the Astoria light-house depot, but the firm failed to carry out their agreement. Various other attempts were made and each was unsuccessful. On February 14, 1901, an agreement was made with another firm to transport the vessel across the Fort Canby, Wash., Military Reservation, launch and float her in Bakers Bay, and deliver her at the Astoria light-house depot wharf, within 35 working days, for \$17,500. This was done, though not within the time agreed upon. On April 23, 1901, an agreement was made with the same company to repair the hull of this vessel for \$10,925. On May 24, 1901, additional repairs to the hull, at a cost of \$1,110, were authorized. On June 3, 1901, the vessel was launched in Bakers Bay, Washington, and was towed to Portland, and arrived there on June 7, 1901. On June 14, 1901, the Board authorized additional work to the hull at a cost of \$570. On June 28, 1901, the Board authorized repairs to the boiler and machinery, for \$980.

These are the facts in brief: This vessel was stranded on November 29, 1899, and she lay where she struck the shore for some 16 months, being continually pounded by the surf. Meantime several unsuccessful attempts were made to haul her off the beach into the ocean. In the spring of 1901, when she was lying broadside to the shore, partly filled with sand, another firm cleaned her out, hove her bow around to the shore, jacked her up onto a temporary railway built for the purpose, and hauled her across the land, through the woods, some 700 yards, to Bakers Bay, where, after being sufficiently repaired so that she would float, she was launched and was towed to Portland, Oreg., for thorough repair. Something of this extraordinary work will be seen from the accompanying cuts. The vessel is now undergoing further repairs, and it is expected that she will soon be replaced on her station.

159. *Umatilla Reef light-vessel, No. 67, seacoast of Washington.*—The repairs and alterations from electric to oil illumination were completed in August, 1900, and the vessel was replaced on her station on

* September 6, 1900, when the red gas-lighted buoy marked "Light-vessel moorings," in black, which had temporarily marked the station, was withdrawn. On October 23, 1900, this vessel went adrift from her station and brought up in Neah Bay, Washington. She was furnished with new moorings and was replaced on her station on November 6, 1900. On December 15, 1900, she again went adrift from her station and again brought up in Neah Bay, Washington. She was furnished with new moorings and replaced on her station on January 8, 1901. On January 10, 1901, she again went adrift from her station and brought up at Port Angeles, Washington. She was furnished with new moorings and replaced on her station on January 28, 1901.

Relief light-vessel for the Twelfth and Thirteenth light-house districts, Pacific Coast.—The act approved March 3, 1901, appropriated \$90,000 to construct, equip, and outfit, complete for service, a first-class steam light-vessel, with steam fog-signal. This vessel is now being designed to the following dimensions: Length on load water line, 118 feet; beam molded, 28 feet 8 inches; depth from top of keel to main deck top of beam, 14 feet 11 inches; displacement, on 12-foot draft, 660 tons. The vessel is to have two continuous decks and a lower deck forward and aft. She will be built of steel throughout and of extra strength, with large capacity for fresh water, oil, and fuel. She will be fitted with automatic steam windlass, steam heating, etc., and the living quarters will be roomy, airy, and light. She will carry three lens lanterns on each mast, at a distance from the sea level of about 45 feet. Oil will be used for the lamps, which will travel on guides riveted to the masts.

The engine will be vertical compound cylinders, 16 by 32, and 24-inch stroke. There will be two so-called gunboat-type boilers, 16 feet 4½ inches in length and 9 feet 3 inches in diameter, designed for a working pressure of 100 pounds per square inch.

DAY BEACONS.

The day beacons were renovated and are in good condition. One beacon was established and three were discontinued during the year.

FOG SIGNALS OPERATED BY STEAM OR HOT AIR.

61. *Coquille River, Oregon.*—The Daboll trumpet was in operation some 440 hours and consumed about 9 tons of coal.

62. *Cape Arago, Oregon.*—The Daboll trumpet was in operation some 352 hours and consumed about 4 tons of coal.

83. *Tillamook Rock, Oregon.*—The first-class siren was in operation some 136 hours and consumed about 9 tons of coal.

84. *Columbia River light-vessel, No. 50, Washington.*—The light-vessel having been off her station during the year, the 12-inch steam whistle was not in operation.

152. *Grays Harbor, Washington.*—The first-class siren was in operation some 532 hours and consumed about 49 tons of coal.

158. *Destruction Island, Washington.*—The first-class siren was in operation some 288 hours and consumed about 22 tons of coal.

159. *Umatilla Reef light-vessel, No. 67.*—The 12-inch steam whistle was in operation some 319 hours and consumed about 14 tons of coal.

160. *Cape Flattery, Washington.*—The 12-inch steam whistle was in operation some 478 hours and consumed about 29 tons of coal.

164. *New Dungeness, Washington.*—The 12-inch steam whistle was in operation some 282 hours and consumed about 20 tons of coal.

166. *Point Wilson, Washington.*—The 12-inch steam whistle was in operation some 218 hours and consumed about 21 tons of coal.

172. *Point No Point, Washington.*—The Daboll trumpet was in operation some 205 hours and consumed about 207 gallons of oil.

174. *West Point, Washington.*—The Daboll trumpet was in operation some 190 hours and consumed about 2 tons of coal.

177. *Robinson Point, Washington.*—The 12-inch whistle was in operation some 111 hours and consumed about 9 tons of coal.

203. *Turn Point, Washington.*—The Daboll trumpet was in operation some 213 hours and consumed about 41 gallons of oil.

204. *Patos Island, Washington.*—The Daboll trumpet was in operation some 161 hours and consumed about 43 gallons of oil.

BUOYAGE.

During the year 15 buoys, including 1 bell buoy, were established, and 2 discontinued. The buoyage of the district is in good condition. The buoys which could be worked by the tender were changed, but owing to other work the *Manzanita* was required to do the buoy work could not, in some cases, be attended to as promptly as was desired. All the whistling and bell buoys are in good condition.

LIGHT-HOUSE DEPOT.

Tongue Point, near Astoria, mouth of the Columbia River, Oregon.—The water pipes were extended along the wharf 117 feet, and 4 new hydrants were put in for protection against fire. Some repairs were made to the dwelling. The act approved June 6, 1900, appropriated \$5,000 to erect two isolated oil houses in which to store coal oil for use in the Thirteenth light-house district, with a track extending from them to the depot wharf. Plans and specifications for the erection of the oil houses were prepared, and it was decided that the building should be done by contract, and that the work of preparing the site and tramway should be done by hired labor and the purchase of material in open market. The work of preparing the site and tramway was completed, and on May 24, 1901, proposals were opened for the erection of the oil houses. The lowest bid was in excess of the appropriation available for the work, and modifications were made in order to bring the work within the amount of the bid. Contract papers are now being prepared.

LIGHT-HOUSE TENDERS.

Manzanita.—This wooden screw steamer was built in 1879, and is of 450 tons gross burden. She steamed some 13,203 miles on about 1,168 tons of coal. She was under steam some 338 days, and her machinery was in motion some 62 days. She delivered 188 tons of coal at the light and fog-signal stations and light-vessels; established, changed, replaced, or renovated 124 buoys; repaired, repainted, or rebuilt 18 beacons; made 10 inspection trips; delivered 293 tons of supplies, etc., also about 21,476 feet of lumber at the various light-stations, post lights, and light-vessels, and was employed 489 hours at the buoy depot renovating buoys and the like.

Columbine.—This steel screw steamer was built in 1892, and has a displacement of about 550 tons. During the year she steamed some 16,117 nautical miles and consumed about 1,599 tons of coal. She was used for construction and repair duty and, in addition, landed 88 tons of coal, 114 tons of freight at light and fog-signal stations; set, changed, and renovated 138 buoys; established 15 new aids, renovated 16 beacons, renovated 41 post lights, and made 12 inspection trips, and when not otherwise employed was employed at the light-house depot. During January, 1901, she was docked and cleaned and a coat of anticorrosive compound and one of antifouling compound were applied.

Heather.—The following statement was made in the Board's last annual report:

By the act approved March 3, 1899, \$100,000 was appropriated for "the construction of a large, powerful, seagoing tender for the Thirteenth light-house district." Plans and specifications were made for this vessel, bids were advertised for and received, but when opened it was found that each was in excess of the amount of the appropriation. These facts were laid before Congress, when, by act approved June 8, 1900, authority was given to contract for this vessel at a total cost not exceeding \$120,000. The Board therefore recommends that a further appropriation of \$20,000 be made therefor.

The act approved March 3, 1901, appropriated the additional \$20,000 needed for the completion of this tender. Bids for the building of this vessel were again asked, which resulted in the reception of one bid, and that was for an amount exceeding the amount authorized by the last-named action of Congress. The Board then modified the plans to such an extent that the only bidder for the work was enabled to modify his bid so as to bring it within the amount of the sum specified, when contract was made for the construction of the vessel upon the modified plans.

This vessel is now being built at Seattle, Wash. Her length over all is to be 178 feet 6 inches. Her length on her water line is to be 170 feet; beam molded, 28 feet 6 inches; depth of hold, 14 feet 11 inches; displacement, 730 tons. The material is to be all open-hearth mild steel. The superstructure and deck house will contain accommodations for the light-house inspector, the officers and crew of the vessel, and is built of steel riveted to the main deck beams. Care has been taken to make the vessel strong and capable to weather the heavy seas of the Pacific and the breakers on the Columbia River bar. There are six water-tight bulkheads and two trimming tanks. The vessel has one compound vertical surface condensing engine with cylinders 23 inches by 43 inches by 30-inch stroke, with steam furnished by two Scotch boilers 12 feet 6 inches in diameter and 12 feet in length, constructed for a working pressure of 100 pounds by gauge. The surface condenser contains 1,650 square feet of cooling surface. The vessel is to be rigged as a two-masted schooner without yards. The contract was approved early in February, 1901, and the vessel to be built in twelve months from that date. Owing to the strikes and to the distance between the works of the contractors and the rolling mills in the East, it is feared that the delivery of the vessel will be somewhat delayed. All the material is now in the contractors' yard, and it is expected that the work will be vigorously pushed henceforth.

FOURTEENTH DISTRICT.

The Fourteenth district extends on the Ohio River from Pittsburg, Mo., to Cairo, Ill., 966 miles; on the Tennessee River, 255½ miles, and on the Great Kanawha, 73½ miles; in all, a distance of 1,295 miles, and embraces all the aids to navigation within these limits.

Inspector.—Commander C. T. Forse, United States Navy, to July 2, 1900; Commander W. H. Turner, United States Navy, from July 2, 1900.

Engineer.—Maj. William H. Bixby, Corps of Engineers, United States Army.

There are in the district—

Post lights	489
Day marking lights	37
Light-keepers	485
Steam tender <i>Goldenrod</i> , for supply and inspection	1
Number of day marks	4

During the recent spring inspection trip all the stations were visited; lantern posts were painted, the trees and brush were cleared away. Acting on petitions received from pilots, several new lights were established, a few were discontinued, and various changes were made in stations. Few complaints relative to the lights were received. Masters and pilots have shown high appreciation of the Board's efforts to make navigation of the rivers in this district safe and easy. There are in this district 526 lights, of which 489 are post lights and 37 are day marking lights, and there are 4 day marks. There are 485 light-keepers; 6 posts were established and 6 discontinued; 3 posts were moved; 48 lanterns were reset; 1,781 trees were cut; 8 acres of brush were cleared; 1,402 gallons of oil were distributed, and 63 gross of wick were distributed.

LIGHT-HOUSE TENDER.

Goldenrod.—This is a steel, stern-wheel steamer. She was built in 1888 and is of 461 tons gross. Two trips of supply and inspection are made during the year. She steamed about 5,100 miles and consumed some 653 tons of coal.

FIFTEENTH DISTRICT.

The Fifteenth districts extend on the Mississippi River from the head of navigation to Cairo, Ill.; on the Missouri River to Kansas City, and on the Illinois River to La Salle, and includes all the aids to navigation within those limits.

Inspector.—Commander U. R. Harris, United States Navy.

Engineer.—Col. Amos Stickney, Corps of Engineers, United States Army.

Number of fixed and floating lights on June 30, 1901	522
Lights established	48
Lights discontinued	37
Number of keepers	346
Number of channel marks	178
Number of trees cut down above 4 inches in diameter	2, 489
Number of acres cleared of willows and underbrush	185½
Number of gallons of oil issued	14, 165½
Wicks issued, gross	88½
Steamer <i>Lily</i> , for supply and inspection	1

Navigation closed on the Mississippi and Illinois rivers at the following-named dates:

From St. Paul to Hastings, October 31.
 From Hastings to Keokuk, November 15.
 From Keokuk to Quincy, November 20.
 From Quincy to Hamburg, November 15.
 From Hamburg to Grafton, November 30.
 From Grafton to Alton, December 22.
 From Alton to St. Louis, December 27.
 From Sand Point to Beardstown, November 15.
 From Beardstown to mouth of Illinois River, November 30.

The average date of discontinuance was November 29. Between St. Louis and Cairo navigation was suspended about thirty days on account of ice and low water. The exhibition of lights during this time was suspended.

In the spring the lights were again exhibited on the following-named dates:

Between St. Paul and foot of Lake Pepin, May 1.
 Between the foot of Lake Pepin and Lansing, April 15.
 Between Lansing and Clarksville, April 1.
 Between Clarksville and Grafton, March 16.
 Between Grafton and St. Louis, March 13.
 Between Sand Point and Beardstown, March 16.
 Between Beardstown and mouth of Illinois River, March 13.

The average date of exhibiting these lights again was March 31.

THE LIGHT-HOUSE TENDER.

Lily.—This is a wooden side-wheel steamer, built in 1875, and is about 507 tons gross burden. She made 11 trips of supply and inspection—3 trips on the Mississippi River above St. Louis, 6 on the Mis-



Mississippi River between St. Louis and Cairo, and 2 on the Illinois River. The hull of the tender, which was repaired at Mound City in January and February, is now in excellent condition. The decks, wheelhouses, and upper works, and the main boilers are in good condition. The main engines, which have been in use since 1875, are old and worn. The tender ran about 5,916 miles and burned some 26,712 bushels of coal during the year.

The following is a recapitulation of the work done by the light-house tender: She was employed 178 days, was unemployed 187 days, and was under way about 1,506 hours. She issued 14,165 gallons of illuminating oil and 88 gross of wicks. She visited 1,849 light-stations, moved 272 light-stations, reset 52 light-stations, established 48 lights, discontinued 37 lights, established 95 day marks, and discontinued 40 day marks.

The number of lights on June 30, 1901, was 522. The number of day marks on June 30, 1901, was 178. The number of keepers June 30, 1901, was 346. Some 185 acres of willow and brush were cleared away and 2,489 trees of more than 4 inches in diameter were felled.

The light-keepers on the Mississippi and Illinois rivers have been attentive to their duties. Few complaints of lights being out have been received. The keepers who did not make satisfactory excuses had their pay accordingly reduced.

The lights in the Missouri River were not shown this year, as no request was made for them. These lights have not been in operation since September, 1896, nor has the tender made a visit to the stations on that river since April, 1898. The outfits are still in charge of the former keepers.

It appears from the reports of masters and pilots of river steamers that they are satisfied that the lights have been maintained in an efficient manner.

SIXTEENTH DISTRICT.

The Sixteenth district extends on the Mississippi River from Cairo, Ill., to New Orleans, La., and on the Red River a distance of 9 miles, and includes all aids to navigation within those limits.

Inspector.—Lieut. Commander James M. Helm, United States Navy, to September 30, 1900; Lieut. Commander A. C. Dillingham, United States Navy, from September 30, 1900.

Engineer.—Capt. C. L. Potter, Corps of Engineers, United States Army.

In this district there are—

Post lights	374
Light-keepers	346
Laborers attending post lights dropped	132
Laborers attending post lights employed	146
Steamer <i>Joseph Henry</i> , for supply and inspection	1

POST LIGHTS.

There are in this district 374 post lights, attended by 346 keepers, being an increase of 14 post lights and 10 keepers in the past year. The efficiency of the district has been enhanced by the use of improved post lanterns in which have been placed 8-inch fresnel globes, materially increasing their illuminating power, and by the addition of a number of day marks, of which there are now 57 in position at important crossings.

Complete inspections of the district were made during each quarter of the year. During the year 1,494 post lights were visited, inspected, painted, and supplied; 143 post lights were moved; 32 post lights were established, and 18 post lights were discontinued; 132 laborers attending post lights were dropped and 146 laborers were employed to attend post lights. About 3,941 trees were felled, each over 4 inches in diameter; 44 acres of willows, cottonwood, and brush were cleared; 15,205 gallons of mineral oil and 76 gross of lamp wicks were issued.

LIGHT-HOUSE TENDERS.

Oleander.—By the act approved on June 6, 1900, an appropriation of \$30,000 was made "toward constructing, equipping, and outfitting complete a new steam tender," and it was further provided that "the total cost of said light-house tender, under a contract which is hereby authorized therefor, shall not exceed \$60,000." By the act approved on March 3, 1901, a further appropriation was made "for completing steam tender for the inspector, Sixteenth light-house district." This tender, which is to be called the *Oleander*, is well in hand and will be finished in due time.

Joseph Henry.—This wooden side-wheel steamer was built in 1880 and is of 453 tons gross burden. By reason of her age she is con-

stantly in need of repairs, and it requires great care to keep her fit for service. During the year she steamed about 8,504 miles and consumed some 1,418 tons of coal. She was under steam 143 days, exclusive of 222 days on the donkey boiler. The machinery was in motion, exclusive of the electric-light engine, for about 67 days.

OFFICE WORK.

The office work of the district consisted of the keeping of the accounts of 410 post lights, including 18 post lights discontinued during the year, the preparation of the vouchers representing disbursements aggregating \$69,772.18; the required reports and returns and the maintenance of official and routine correspondence, together with notifications of the changes in the position of lights, the establishment of new lights or discontinuance of old lights, mailed to newspapers, to the pilots' associations at St. Louis, Mo., Cincinnati, Ohio, Louisville, Ky., and New Orleans, La., to the harbor association of pilots at those places, and to the pilots' boxes at Cairo, Ill., Memphis, Tenn., Greenville, Miss., Vicksburg, Miss., Natchez, Miss., Baton Rouge, La., and New Orleans, La.

CONCLUSION.

The Board feels warranted in reporting, in conclusion, that the general efficiency of the service has been maintained throughout the year at as high a standard as was practicable with the means available.

N. H. FARQUHAR,

Rear-Admiral, United States Navy, Chairman.

W. MAYNARD,

Captain, United States Navy, Naval Secretary.

D. W. LOCKWOOD,

*Major, Corps of Engineers, United States Army,
Engineer Secretary.*

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